CLASS BOOK

VOLUME

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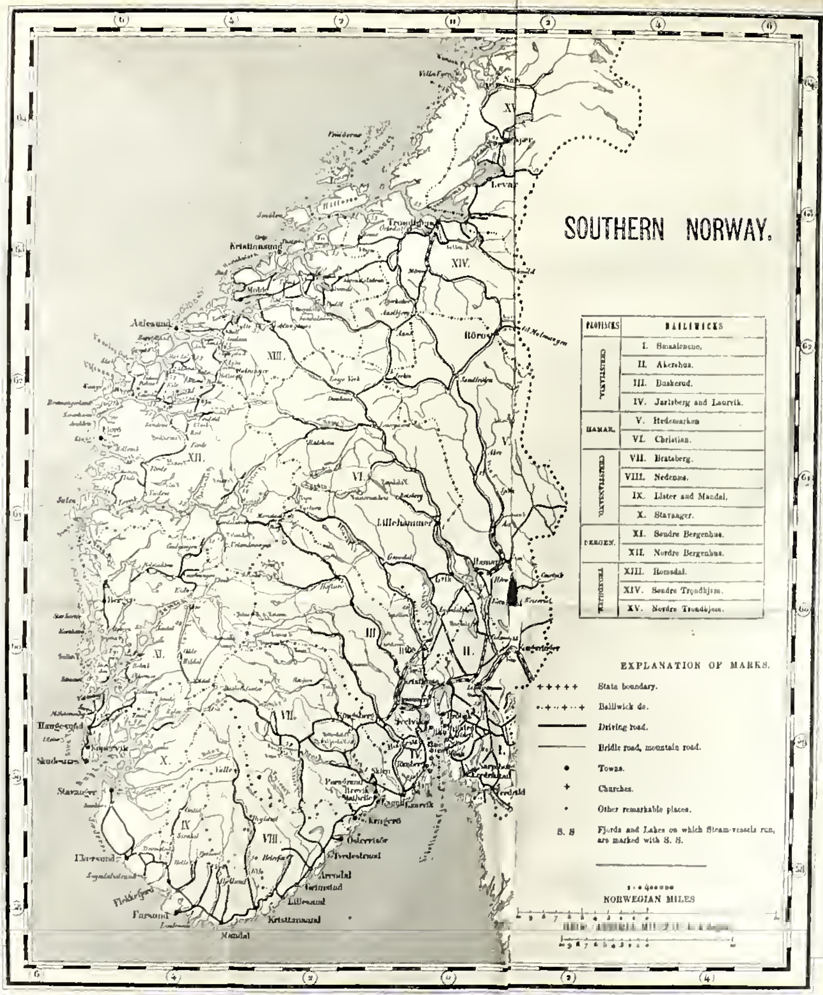

PROVINCES	BAILIWICKS
CHRISTIANIA.	I. Smaalenene.
	II. Akershus.
	III. Buskerud.
	IV. Jarlsberg and Laurvik.
HAMAR.	V. Hedemarken
	VI. Christian.
CHRISTIANSAND.	VII. Bratsberg.
	VIII. Nedenæs.
	IX. Lister and Mandal.
	X. Stavanger.
BERGEN.	XI. Søndre Bergenhus.
	XII. Nordre Bergenhus.
TRONDHJEM.	XIII. Romsdal.
	XIV. Søndre Trondhjem.
	XV. Nordre Trondhjem.

EXPLANATION OF MARKS.

+ + + + +	State boundary.
·+··+··+	Bailiwick do.
━━━	Driving road.
───	Bridle road, mountain road.
●	Towns.
+	Churches.
•	Other remarkable places.
S. S	Fjords and Lakes on which Steam-vessels run, are marked with S. S.

NORWEGIAN

SPECIAL CATALOGUE

FOR THE

INTERNATIONAL EXHIBITION

AT

PHILADELPHIA

1876.

CHRISTIANIA.
PRINTED BY B. M. BENTZEN.

1876.

FUNCTIONARIES

CONNECTED WITH NORWAY'S PARTICIPATION IN THE INTERNATIONAL EXHIBITION AT PHILADELPHIA.

Chief Commissioner FOR NORWAY:

HERMAN BAARS Esq. Knight of the Norwegian order of St. Olaf, of the French legion of honor, Dutch order of the oak crown, Prussian order of the red eagle, Spanish order of Isabella.

Assistant Commissioner for Christiania and South-eastern Norway:

CONSUL GENERAL **CHR. CHRISTOPHERSEN** in Christiania.

Chief Commissioner IN PHILADELPHIA:

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64225

COMPARISON OF NORWEGIAN, ENGLISH AND FRENCH MEASURES, WEIGHTS AND MONEY.

Norwegian.	English.	French.
1 foot (Fod)	1,0294 feet	0,3137 mètre.
1 mile (Mil)	6,099 geogr. miles 7,0186 miles	11,2950 kilomètres.
1 □ foot (Kvadratfod)	1,0596 □ feet	0,0984 mètre carré.
1 Maal	0,2363 acre	0,0984 hectare.
1 Pot	0,2124 gallons	0,9651 litre.
1 barrel (Tønde) corn, coals	3,8235 bushels	1,390 hectolitre.
1 — — fish, oil, tar	3,1862 bushels	1,158 hectolitre.
1 Com. Læst for vessels above 200 tons	2,05 ton	2,05 tonneaux.
1 Com. Læst for vessels under 200 tons	2,30 ton	2,30 tonneaux,
1 Com. Læst for Norwegian vessels in general	2,10 ton	2,10 tonneaux.
1 Pound (Pund)	1,0981 pound avoir dupois	0,4981 kilogrammes.
1 Vog	39,533 — — —	17,932 —
1 Skippund	351,4053 — — —	159,396 —
1 Krone à 100 Øre	0,056 £	1,405 francs.
1 Speciesdollar	0,224 £	5,62 francs.

The above unities for weights and measures will cease to be recognised from the 1 January 1878 from which time the metrical French system will be adopted for Norway.

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Norway,

the western part of the Scandinavian peninsula, is situated between 57° 57′ and 71° 10′ north latitude and between 22° 17′ and 48° 43′ east longitude (meridian of Ferro).

Its area amounts to 316,649 square Kilometres, of which 88,077 north of the arctic circle, 82,143 between this line and latitude 62° and 146,429 south of latitude 62.

The population is a little over 1,800,000, of which abt. 300,000 in the cities; the remainder in the country.

Notwithstanding the high latitude of Norway, its climate is proportionately very mild, especially along the western coast which is washed by the warm waters of the gulfstream, and where the thermometer even on the other side of the arctic circle, is seldom below zero (Celsius), while the vicinity of the arctic Ocean counteracts the influence of the sun in the long summer days. The eastern part of the country has an inland climate, cold winters and warm summers. At the North Cape (Fruholm), 71° 1‘ N. L., the mean temperature from November to April is ÷ 2,37° and from May to October + 6,3°; at Reine in Lofoten, 67° 9‘ N. L., ÷ 0,13° and + 8,47°; at Aalesund, 62°, 5‘ N. L., + 2,72° and + 10,52°; at Elverum, 60° 9, N. L., ÷ 6,47° and + 10,22°; at Christiania, 59° 9‘ N. L. ÷ 1,95° and + 12,21 Celsius.

And it is only this favourable climatic position which makes it possible for the inhabitants to dwell and subsist in Norway, while so many other parts of the earth at lower latitudes are not inhabited and not cultivated.

But only a small part of Norway is cultivated in the true sense of the word.

Its soil consists principally of rocky mountains (granite, gneiss, syenite) which are not fertile when crushed; but in the valleys these beds are covered with fine earth of decomposed animals and plants. In the eastern part of the country the subsoil is slate and lime-stone, and here the cultivation of the soil is productive.

The arable soil of Norway is estimated at 5,155 square Kilometres, of which 1815 are assigned to the cultivation of grain, 310 to potatoes and the remainder grasses. Besides there are about 5,000 □ Kilometres natural meadow land in the inhabited part of the country and many rich pastures in the mountains.

Of far greater dimensions are the woods, covering abt. 63,750 square Kilometres and being of high importance in the economy of the eastern part of Norway, while the western and northern coasts are regularly visited by large shoals of valuable fishes, which give to the inhabitants abundant means of support. Even the fisheries in the lakes in the interior, of which the surface is about 7,700 □ Kilometres, are of some importance.

Of the surface of Norway, the mountains with their glaciers, rivers and pastures occupy the greater space, abt. 235,000 □ Kilometres.

We have said that these mountains principally consist of granite, gneiss and syenite, which have generally but little value, though their working in some districts has called forth a little industry; but on many places there are valuable mines, and certainly the mountains of Norway contain far greater unknown treasures, which accident or science will sooner or later bring to light, and capital and labor make useful not only for this country but for the entire world.

DEPARTMENT I.

MINING AND METALLURGY.

The produce of the Mining and Metallurgic industry for Norway, is estimated at about 2 millions of Dollars pr. annum.

The first place among the minerals now in work is taken by the pyrites, which occupied in 1870 800 men in 14 mines and delivered nearly 700,000 tons, in value abt. 380,000 Doll. About the same number of men were working in 27 copper-mines, with which were connected 11 furnaces, occupying 75 men, producing about 15,000 tons ore and 500 tons copper in bars or sheets, worth together abt. 350,000 Dollars. Next to these come the iron-mines and furnaces, though considerably reduced in the last years, occupying abt. 600 men and producing abt. 2000 tons ore, 30 tons iron in bars and 2 tons steel, worth abt. 240,000 Dollars, and 7 silver-mines with 360 workmen, producing 800 tons ore and 3,000 Kilogrammes pure silver, worth abt. 300,000 Dollars.

The nickel-mines are very promising, and some have been discovered recently which already in 1870 occupied 200 men and produced ores and nickel to an amount of 100,000 Dollars.

In several places magnetic iron- and titanic iron-ores have been found; lead and zink appear in others, and a little gold has been washed in some of the rivers falling into the arctic ocean.

Felspar abounds in many places; in the eastern part of the country there are found mighty layers of apatite and lime-stone, and clays are sufficient for the consumption in every part of the country.

Of building-stones, especially fine granites, Norway possesses large quantities; slates are found on different places, also white and coloured marbles, of which some are very fine but rarely to be had in large blocks.

Traces of coals have been discovered as well in the north as in the south of Norway, and borings are now made there with good hope.

The exhibited collections and samples of minerals, to which we direct the attention of our readers, will give some idea of the riches contained in the mountains and in the earth of Norway.

MINERALS, ORES, BUILDING-STONES AND MINING PRODUCTS.

CLASS 100.

1. BAMBLE NICKEL-MINES, Kragerø.

Johan Dahll.

Nickel ores,
Metals from different smeltings.
Slags « do.
Roasted powder.
Powder Nickel.

The smelting house of Bamble Nickel-works was erected in 1866 chiefly for the purpose of refining the ore brought from the Nickel mines of Meinkjær and Bamble, which contained 1—3 pCt. Nickel, up to 10—15 pCt. Nickel. The works then employed about 50 laborers. Little by little the smelting operations were extended, and the arrangements improved, so that the works now deliver a product which consists almost exclusively of Metal; namely 65—68 % Nickel, and the rest copper of 33—30 % purity. This metal introduced into the trade under the name of the powder Nickel, is excellently adapted for the production of Argentine; as the copper contained in it makes it very easily fusible. Arsenic and other injurious elements often found in Nickel products, do not exist in the powder Nickel of the Bamble Nickel-works. The works employ now about 150 men, and the yearly yield is 50 to 60,000 pounds of powder Nickel.

The works obtained a prize at the Exhibition at Copenhagen 1872, and Verdienstmedaille Vienna 1873.

2. EVJE NICKEL-MINES, near Christiansand.

Nickel-Ore, free from arsenic.

Mixed metal, containing 50,48 % nickel and 15,00 % copper.

Roasted ores.

Slags.

Nickel-metal.

3. GEOLOGICAL SURVEY OF SOUTHERN NORWAY.

Director: Th. Kierulf, Christiania.

a) Manuscript-maps, natural sections, generalised representations, printed maps.

b) Stones: eruptive rocks, leading strata, constituents of coarse granite Dykes.

The geological survey of Norway was commenced in 1858 according to a plan sketched by Th. Kjerulf (p. t. professor of mineralogy and geology at the university of Christiania) in conjunction with his collaborator, and was placed by the Home Department under the direction of Kjerulf and Tellef Dahl (p. t. mining master).

The object was to obtain a geological map of Norway with accompanying sections.

The work is conducted on base of the geographical survey maps. The 2 or 3 summer months are employed in travelling; and during this time, every year since 1858, expeditions have been made, as well by the directors mentioned as by several other gentlemen engaged for travelling. In the field larger maps are used:

Photographs on the scale of 1: 50.000; portfolio maps 1: 100,000; district maps 1: 200,000. According to the original plan, maps are published on a smaller scale 1: 400.000; but at the same time the publication of detail maps has been commenced (of which up to the present date 2 have appeared) on the scale of 1: 100,000, using the geographical survey rectangular maps as base. The large manuscript map is composed of the district maps (1: 200,000).

The institution has hitherto according to its economical equipment, not had any special bureau. The numerous specimens collected have been hitherto deposited in the mineralogical cabinet at Christiania. Various synopses and details have hitherto been published in the existing journals: Nyt Magazin for Naturvidenskaber, Christiania Videnskabsselskabs Forhandlinger, University programmes, such as:

On the geology of Finmark by T. Dahl	Chr. V. S.
On the geology of Thelemark by T. Dahl	Nyt Mag.

On the iron-ores of Arendal, Næs, Kragerø	Nyt Mag.
On the mines of Kongsberg	Nyt Mag.
On the glacial and postglacial deposits	Un. progr.
On terraces, shell-banks and scouring marks	
On the bottom rock or fundamental formation	Un. progr.
On the sparagmite rock or etage No. 1	
On the silurian etages (guide in the Christiania Valley)	Un. progr.
On the geology of the province of Throndhjem	Nyt Mag.
On old sea-beaches, by Professor Mohn	Nyt Mag.

From 1858 to 1865 Kjerulf and Dahl — partly in conjunction and partly each by himself — surveyed the southern part of Norway, namely the provinces of Hamar, Christiania and Christiansand. The map was published in 1865 in 10 sheets with sections, explanation of signs and a concise pamphlet.

The names of the gentlemen who were engaged to travel during the summer, are printed in the little page; the marked type indicates those who have specially assisted during several summers. They were at the time partly mining candidates and partly other students at the university: namely Mr. Bachke (p. t. director of the Ytterøen Works), Mr. Dahl cand. min., Mr. Gulliksen (afterwards director of a copper-mine in Italy), Mr. Hansteen (p. t. director at Kongsberg), Mr. Hjorthdahl (p. t. professor of Chemistry at the university of Christiania), M. Irgens (p. t. teacher at the agricultural school at Aas), Mr. Kvale (p. t. director at the Vinoren works), Mr. Meinich (p. t. director of the Askim Nickelworks), Mr. Mohn (p. t. Professor of Meteorology at the university of Christiania), Mr. Mortensen (p. t. mining engineer), Mr. Olsen (p. t. director at the Foldal works), Mr. Otterbech cand. min., Mr. Stalsberg (p. t. smelting master at Kongsberg), Mr. Sundt (p. t. director of a copper-mine in Chili), Mr. Waage (p. t. professor of Chemistry at the university of Christiania).

In the same manner such talents have been subsequently engaged as could be made available; but it was necessary besides to procure ordinary assistants who could work year after year. Such were Mr. K. Hanow (p. t. manager of the smelting house at Eide), Mr. Corneliussen cand. min., Mr. K. Pettersen (assistant master at the school of Tromsø), Mr. Brøgger and Mr. Reusch.

In 1866 the continued survey of the country was divided, so that Kjerulf undertook the provinces of Throndhjem and Bergen, while Dahl undertook the provinces of Finmark, Tromsø and Nordland. Kjerulf's assistant was Hanow; Dahl's assistants were Corneliussen, Pettersen and, his companion in 2 summers at first, Hjortdahl. From his surveys in Finmark Dahl announced the discovery of gold and coal in 1867. A manuscript map of Finmark on the scale of 1: 400,000 was completed by Dahl in 1870. Dahl then worked with assistance of Pettersen in Tromsø, and is at present working in Nordland with assistance of Corneliussen.

From 1866 to 1874 Kjerulf and Hanow worked in the province of Throndhjem. A synoptical map was published in 1874. The work in the northern regions was in a great degree impeded by the defective old maps which had partly to be used for bases, as there were then no more recent maps.

The survey of the province of Bergen was continued at the same time. For this there existed already excellent preparatory works of Hjortdahl and Irgens; and the latter also took an important part in the survey together with Kjerulf.

Moreover in order to be able to publish detailed maps on the scale of 1: 100,000, it has been necessary to revise some tracts, beginning in the southern part of Norway. The mode of proceeding here is to take the synoptical and manuscript maps as bases and to go over the necessary outlines of the formations, or to survey the ground anew on the basis of newly acquired data. The names of the gentlemen who effectively correct the boundary lines, are placed on each sheet. Of such maps there are as before mentioned 2 published, namely the sheet Christiania and the sheet Hønefos.

Since 1875 Mr. Brøgger and Mr. Reusch are assistants in the survey of the southern part. The first works of these gentlemen „On giants' kettles" (quarterly Journal of the Geol. Soc. of London f. Decbr. 1874) and on the ores of apatite, are inserted in Zeitschrift der Deutschen geologischen Gesellschaft f. 1875.

A synopsis of the data acquired, as well in the South as in the North, is in course of preparation for 1876.

4. GEOLOGICAL SURVEY OF SOUTHERN NORWAY.

Assistant Geologists: W. Brøgger & U. Reusch.

a) Contents of Giant-Kettles, spiral marked interior grindingstones.

b) Newly discovered crystals: Enstatite.

5. GLØRUD NICKEL COMP.

F. H. Frølich & Son, Christiania.

Nickel-ores.

6. HATFIELDDALENS MINES (recently discovered).

Samples of copper-ores and pyrites.

7. HINDERAGER MINING COMP., Bergen.

Copper-ores.

Pyrites.

8. HØYEM, Andreas, Bergen.

Titanic iron-ores.

9. KONGSBERG SILVER MINES, Kongsberg.

Silver ores: polished ores, ores with thin silver plates, ore from the lode with silver and matrix; virgin silver: rounded, chrystalized and sheet; silver and sulphuret, middle-ore, Anthracite, slate spar, Fluor-spar, Galena and chalk, Pyrites, Barytes, rock-crystal with Calc-spar, Raw-stone and slag.

(see No. 22).

Kongsberg Silverworks are situated about 80 Kilometres WSW from Christiania.

The mining is worked on lodes which, with a strike East and West and a very steep dip, traverse the oldest crystalline slates and eruptive rocks, chiefly Hornblende slate, Quartz slate, Mica slate, Chlorite-slate. grey Gneiss, Granite and Gabbro, which here occur and which belong to the bottom rock. In these rocks (excepting however the Granite, there are parts impregnated with pyrites and occurring in more or less regular zones with strike North and South. These zones form the so-called „Fahlbands“ in which the argentiferous lodes occur. The minerals in these lodes are chiefly calcareous spar — usually more or less bituminous – and quartz; then sulphate of Barytes and fluor-spar and a number of other minerals occurring sparsely. The silver appears chiefly as virgin silver, which usually contains a few pr. cent quicksilver and small quantities of arsenic and antimony with traces of gold. Traces of platina have also been found. Silver occurs in smaller quantities in the form of sulphuret, and only in very rare cases other silver ores are found. As these argentiferous lodes traverse the greenstone lodes, which are very similar to those which occur in the neighbouring Silurian slate, the argentiferous lodes must be considered as younger than the Silurian time. Together with the argentiferous lodes there occur other still younger calcareous and quartziferous lodes with light non-bituminous lime, which are not argentiferous.

The mining operations commenced in the year 1623 and were gradually extended over a territory of about 30 Kilometres in length and 13 Kilometres in width, where argentiferous lodes occur in great abundance; and the total working staff amounted in the latter half of the past century to 3,600 men. At last, after the operations for a long series of years had resulted in a considerable loss, the work was as good as entirely stopped in the year 1805 and remained so until 1815. The production up to that time had amounted on the whole to about 561,150 Kilogrammes of fine silver.

In the year 1815 the work was resumed on a smaller scale on the plan of building off the lodes in the „Fahlband“ of the upper rock“.

The following mines were successively worked:

	at the present depth	and with laboring staff
1. Armens Grube	575 metres.	200.
2. Kongens Grube	555 —	
3. Gottes Hulf Grube	425 —	90.
4. Hans Sachsen	255 —	30.

In one of the maps which accompany the articles sent to the exhibition, there is represented a vertical section from the South to the North of the Fahlband of the upper rock and of the mines in this Fahlband: of the older and abandoned mines, as well as of those now worked. The older maps shew the chief works in Armens, Kongens and Gottes Hulfe mines in vertical section, as well in the planes of the lode surfaces as perpendicular to them.

The two first named mines have at the depth of 230 metres an adit to the open, the Crown Prince Frederik's adit, 1220 metres long, and at the depth of 340 metres a deepest adit, Christian the 7th's adit, 2250 metres long; this deepest adit is continued to Gottes Hülfes' mine, which traverses the adit at the depth of 335 metres. The work of the adit is now continued to the last named mine, Hans Sachsens' mine. The stuff quarried from the mines is drawn out to the open on a horse railway in both these adits.

For removing the water from the mines, there is a water column machine with a single-action cylinder and a force pump, also an overshot water-wheel with suction pumps. For conveyance there is a water column machine with two double action cylinders, a turbine and two overshot water-wheels.

The argentiferous products from the hand-sorting are prepared in a Pug-work with 12 stampers at the opening of the upper adit, and in a Pug-work with 18 stampers at the lower adit.

For collecting and leading the water power to the mine-engines and to the Pug-works, there is arranged on the mountain a system of dams and aqueducts built of stone and moss.

The smelting house for bonifying the argentiferous matters, is situated near the Laugen river where this river runs through the town of Kongsberg at a distance of 5—6 Kilometres from the mines.

The larger and smaller lumps of virgin silver, which come direct from the mines, and the silver which in the Pug-works is cleansed to a richness of 85—90 % pure silver, are at once refined in the flame furnace to burned silver of the purity of about 998 to 999 thousandth parts.

The poorer matters, argentiferous slags, are bonified by being smelted, together with sulphur pyrites and lead, to worklead, which is driven off and refined.

Tracts of forest belong to the works in the nearest regions around the mines with a forest area of about 15.000 Hectares.

The total staff of the works is now about 400 men.

The new operations of the works gave in the first 15 years a loss. Subsequently good veins were found, especially in the Kongens Grube where sometimes large continuous masses of virgin silver were quarried. In 1832 there was obtained at one blast a lump weighing 500 Kilogrammes, which formed a part of a still larger continuous mass of virgin silver. In 1867 there was obtained at a depth of 500 metres a continuous mass weighing about 500 Kilogrammes, consisting of virgin silver and sulphuret, of which a lump weighing 161 Kilogrammes is exhibited in the form of a plaster cast.

The total production of fine silver amounts for the years 1815—1875 to 231,500 Kilogrammes, and the net gain, deducting the produce of the forest, will amount to nearly Sp. 4,823,000 (19,292,000 Kroner).

The annual production is now about 4000 Kilogrammes silver and 10,000 Kilogrammes copper, and the annual net gain is about Sp. 45.000 (180,000 Kroner).

This mining work is carried on for account of the state; and in connexion with the same, the state coining establishment is also carried on.

During the last 20 years, there have been moreover several experiments made for private account in mining operations on the argentiferous lodes in the region of Kongrberg; but all these attempts have hitherto been attended with loss.

10. PETTERSEN, Karl, Tromsø.

Samples of minerals from northern Norway.
(see Cl. 335).

11. RINGERIGE NICKEL MINES, Modum.

Dr. H. A. Thaulow.

Nickel-ores, roasted ores, concentration stone, refined nickelstone, slags &c.
(see Cl. 335).

I. A number of pieces of ore shewing the bed rocks, quartzite and gabbro.
II. The ore as magnetic pyrites containing 0.78 % Co. 2,28 Ni. 0,49 % Cu.
III. Ore, quarried magnetic pyrites with 45—60 % rock.
IV. Sulphur pyrites:
  a) light colored containing 59 % Co. 2,12 % Ni. 0,40 % Cu.
  b) grey — containing 0,84 % Co. 2,30 % Ni. 0,83 % Cu.
V. Copper pyrites — containing 0,07 % Co. 0.42 % Ni. 33,24 % Cu.
VI. Roasted ore, mixture of II & III in roasted state.

VII. Raw stone, product of first smelting — containing 0,30 % Co. 5,50 % Ni. 3,65 Cu. 60 % Fr. 26,50 % S., the rest cinder and slag.
VIII. Raw stone in roasted state.
IX. Concentration stone, product of second smelting, containing 0,50 % Co. 12,60 % Ni. 10,20 % Cu. 49,20 % Fr. 26.15 % S.
X. Refined Nickelstone, product of third smelting, containing 1,70 % Co. 43,50 % Ni. 23,70 % Cu. 10,60 % Fr. 20,30 % S.
XI. Refined Nickelstone pulverised, sale product.
XII. Raw slag — Slag after first smelting.
XIII. Concentration slag — Slag after second smelting.
XIV. Refined slag — Slag after 3rd smelting.

The layer of Ertelien (situated on the west side of the Tyrifjord 6—7000 feet west of the Drammen and Randsfjord railway Nakkerud Station) has in the last century been worked for copper; afterwards the magnetic pyrites was used for the manufacture of Vitriol and red color, until the Nickel contained in it was discovered, after which the Nickel works of Ringerige were established. The works employ at present 235 workmen, of whom 110 in the mining and 125 in. the the smelting. The production for the year 1876 will be 4300 to 4500 centners Nickelstone with 200,000 Pd· (100,000 Kilo) Ni. As the ore consists of a mixture of the sorts indicated under II and III, about ¼ of the first named and ¾ of the latter, an average richness is obtained of about 1,20 to 1,30 % in the raw material, and of this about 160,000 centners (8,000,000 Kilo) are required for the production above stated. The magnetic pyrites and the sulphur pyrites are mixed together and treated under one. The smelting houses are situated 12,000 feet north of the Erteli mines about 2000 feet east of the lake Vælern, where the Mjøndal's river flowing out of it forms several waterfalls, the power of which is used to drive the works. Here there are erected 4 furnaces for the first smelting, 2 furnaces for the second smelting and 9 refining hearths. A new smelting etablishment for a product free from Iron and Sulphur is in course of construction. The furnaces are worked by 2 cylinder blowing machines. The mines at Ertelien are connected with the the smelting house by a railway 12,000 feet long, on which the ore is transported. The railway is worked by a 20 horse-power turbine, and has been in activity since the beginning of 1874. Its carrying power is 120 to 150 centners per hour.

At the Erteli mines there are 2 10-horse power steam engines for the transport of rock and for pumping. At the smelting house there is a 12-horse power steam engine as reserve.

The Ringerige Nikkelworks have taken part in other exhibitions and obtained Bronze medals in **London**, **Paris** and **Copenhagen**, Medal of merit at **Vienna** and the silver medal at **Drammen**.

12. ROM NICKEL MINES, Askim pr. Christiania.

Nickel ore, ...	1¾ % Ni.
Nickel-stone, ...	5 % «
Nickel speiss	20 % «
Nickel sulphide	40 % «

Ball Authophyllite (potato-rock).

These works are situated about 35 miles from Christiania, about 20 miles from the nearest sea port and less than 1 mile from a railway, which is to be finished in 1878.

The first working was commenced in 1866 and was continued experimentally till 1872, when the work was taken up on a larger scale and a smelting house was etablished.

The most important mines actually worked are at Romsaas in Askim.

The ore is magnetic pyrites containing on the average 4 % of Nickel and Cobalt, and usually occurring in Gabbro, sometimes in Chloritic Slate and sometimes in Granite veins. Of other concomitant ores there are found a little Copper pyrites and Arsenic pyrites. No Zincblende nor any other minerals prejudicial to the smelting are found. There are several workable vertical veins, and more and more are found as investigation proceeds. In the middle mine, which is the best known, there are at least 6 veins close together, each with a thickness of 1—5 Metres and of which some have been traced 90 Metres in the direction of the strike and 50 Metres in depth. At this depth there is an adit which for many years will secure advantageous conveyance of the ore and outlet for the water. At 600 metres from the mine, there is a water-fall of 14 feet at Kykkelrudfos in the Glommen, from which any amount of power may be disposed of.

During the last 3 years, there has been raised from the mines respectively 2400, 3100 and 3500 tons of ore; in future there will be raised about double the quantity, and the ore is so abundant that if it were decided to extend the smelting etablishment, many times that quantity could easily be raised.

The ore is considerably mixed with the rock; so that the produce of the smelting of about 8000 tons was on the average ⅔ % of Nickel; at a greater depth the ore seems to be more free from mixture and about 1600 tons smelted this year have given rather more than 1 % Nickel. A sample of the best sort of ore is exhibited.

On the western border of the Gabbro, towards the adjacent slate, there is a rare aud peculiar rock, globular-authophyllite (Potato rock) of which a piece is exhibited.

The smelting-house is at present 1000 metres from the mines at Rudfos and can smelt 7000 tons yearly. There is a turbine of 22 horse-power and a steam engine of 12 in reserve; 4 blowing machines, 2 large smelting furnaces, 3 smaller concentrating furnaces, 4 refining hearths and 2 roasting houses.

The salable produce has not been hitherto brought out to more than 40 % Nickel. Samples of various products are exhibited.

The working staff of the establishment has been during the last 3 years, and is at present, rather more than 100 men.

These works are for sale through Messrs. **Holter & Borgen**, Christiania.

CLASS 102.

13. LÜTTENSEE, Georg, Christiania.

Quarry stone for Street pavement.

Curb stones.

Luttensee's Stone-cutting establishment employs only hand-power in several different places in Norway and Sweden, with a total working staff of about 200 men.

The manufacture comprises generally all sorts of stone used in paving, and all sorts of hewn stone for Jetties, Quays, Docks, Fortifications, Monuments &c.

Sale mostly for Export.

14. MOESTUE & Co. Thv., Christiania.

Slates for tables }
« « roofs } from «Slidre Quarries».
« « floors }

(see Cl. 261, 263, 283, 322).

Silver medal, Drammen 1873.

15. SAXFIORD SLATE WORKS, near Tromsø.

Samples of slates.

CLASS 104,

16. FASMER & SON, J. H., Bergen.

Felspar.

CLASS 106.

17. LØNSETH, Fred., Christiania.

Selbo Mill-Stones.

Flint Mill-Stones.

Factory established 1873. Employs 11—12 workmen, in connexion with a plaster mill worked by water power and a 10 horse-power steam engine.

18. CHRISTIANIA MILL-STONE FACTORY.

Flint Mill-Stones.

(Established 1867 by L. Bertol.)

All the raw material (Flint stone) is brought from France, and the stones are put together in this country, according to a judicious system of selection and connexion, with special reference to their particular use.

Market Norway and Sweden.

19. JOHANSEN, Otto, Sindsen pr. Christiania.

Norwegian Emeralds.

The emeralds are found at a distance of 30—40 feet from the shore of the lake Mjøsen, in a Quartz lode mixed with Barytes and about 4 feet wide. The mountain consists otherwise of Alum slate and greystone. The lode, which goes round the foot of the mountain, is of unknown depth and length.

(The price of the Invoice is nominal, in so far as it only represents the working expenses).

CLASS 107.

20. BAMBLE APATITE MINES, Kragerø.

Johan Dahll.

Apatite-ore (Phosphate of lime).

21. FRØLICH & SON, F. H.

Collection of Norwegian Apatite-ores (Phosphate of lime).

METALLURGICAL PRODUCTS.

CLASS 108.

23. KONGSBERG SILVER MINES, Kongsberg.

Silver in Bars.
Granulated silver.
(see No. 9).

CLASS 111.

24. CATHRINEHOLM IRON-WORKS AND FOUNDRY, Fredrikshald.

Round, square & flat iron.
Cast iron plates & riveted plates.
Bars of wrought iron flat.
do. of round iron.
Round iron bolts.
Wreathed shrouds.
Knots of iron.
Anchor chains & stiffdrawn chains.
(see Cl. 267, 670).

Price for CH charcoal-iron hammered pr. 112 Pd. eng, Doll. 4. 33.
— „ CH do. rolled — — — 3. 82..

Cathrineholm Iron-works established in 1827.

The present owners took over the traffic in 1859. The works are driven by water-power for twelve motors of about 350 horse-power, and also by a large steam hammer.

The situation, near one of the largest saw mills in the country and close to the sea, has hitherto favored the progress.

The chief product of the works is CH charcoal-iron, of which there is produced annually 1600 to 2000 tons, the latter being nearly the limit of the production: as access to charcoal, at least for the present, is confined to the refuse from the saw-mills. CH charcoal-iron is produced from the best Swedish „Pehrsberg's“ pig iron, which is puddled in simple hearths according to the Lancashire method and welded in gas welding furnaces by gas prepared from pure saw-dust and cleansed by the Lundin method of condensation.

The managers of the works direct their attention exclusively to producing the best possible iron, the application of which is therefore more calculated for technical purposes than for competition with ordinary iron. Of CH charcoal-iron, there are manufactured at the works:

Boiler-bolts, dogs, chains, railway and armor-plate-bolts always of double welded iron, axles and other parts of machinery for which trustworthy tough iron is required. What is not employed for that purpose has been used with advantage for steel iron-wire and finally for bar- and rod iron furnished in all dimensions. The working staff is 250 men.

Besides CH charcoal-iron and the articles manufactured from it, the works furnish castings, machines, agricultural implements and nails, annually 3 to 400 tons.

The manufactures of the works find for the greater part their application in the country, but they have been also sold as well to England and the European Continent as to America, Australia and Africa and have been everywhere satisfactorily appreciated.

The manufactures of the Cathrineholm works have not yet been exhibited at any of the larger universal exhibitions; but at the **Exhibitions** in **Copenhagen**, **Stockholm**, **Aarhuus**, **Christiania** and in many places in this country, distinctions have been awarded to them.

DEPARTMENT II.

MANUFACTURES.

Norway possesses an immense quantity of motive power in its numerous and mighty water-falls, of which many are near good harbours and open sea; but nevertheless its manufacturing industry, though much developed during the last twenty years, is still of little importance and far from sufficient for the consumption of the country. — The importation of all chemical, ceramic, textile and metallic articles is proportionately very great.

Of fish-oil only, Norway has a large surplus; the exportation exceeding 10,000 tons per annum, of which more than 1000 tons consist of the celebrated medicinal cod-liver-oil, known and appreciated everywhere in the old and new world.

Of other chemical preparations, matches take the first place; the fabrication occupying at least 800 individuals, and the exportation augmenting every year to nearly all European and transatlantic countries.

The ceramic industry is rapidly developing, and especially the fabrication of bricks, which is giving work to about 2500 individuals; while 7 potteries and 2 crockery-factories occupy abt. 200 working-people.

Even the glass-industry advances rapidly; and without doubt Norway will soon be able to export bottles, phials &c. of green or brown glass.

The fabrication of furniture has made great progress in the latter years; and the Norwegian artisans may certainly without difficulty compete with those of other countries as soon as they learn to divide their labor more than hitherto, and to take advantage of convenient machines instead of handwork.

The textile industries occupy about 4000 work-people, and some branches thereof have attained such development, that Norway can export considerable quantities of the products to neighbouring countries, viz. cotton-, woollen- and linen-yarns (in the year 1871 to an amount of about 170,000 Dollars), woollen-goods (180,000 Dollars) and hemp- and flax-goods (150,000 Dollars).

The fabrication of filigree silver-ornaments is of some importance, since the old gothic and norse forms have attracted more attention abroad. The exhibition contains very beautiful collections of such silver-ornaments.

The paper-industries are still insufficient for the consumption of the country; but it will probably soon be able to export large quantities of its produce, possessing raw-materials and motive-power in abundance in its woods and water-falls. At present these industries occupy abt. 1000 hands; but some very large establishments for the fabrication of wrapping- and printing-paper, principally from wood-pulp, have recently been erected or are on the point of being finished and commencing work.

Of hardware large quantities are imported principally from Great-Britain, Germany and France, besides a few articles from the United States, but the manufacture in Norway is increasing.

The Norwegian wooden vehicles, of which some are exported, will certainly excite interest, being light, commodious and suitable for mountainous countries.

But if the manufacturing industries be of no great importance in the economy of Norway, the domestic-work, especially in the country, is of great value. Here the men make all their tools and furniture, and the women do all the work for the clothing industries, such as spinning, weaving, sewing etc. — Our readers will find some specimens of their skill in the Women's-Works building.

CHEMICAL MANUFACTURES.

CLASS 200.

25. BERGEN GAS-WORKS, Bergen.

Sulphate of Ammonia, raw and refined.

CLASS 201.

26. STEEN, Daniel, Christiania.

Toilet soaps.

(see No. 29).

CLASS 202.

27. RODE, C. N., Porsgrund.

Scandinavian ink., writing and copying.
Encre violette noire communicative.

28. FUGLESANG, G. R., Christiania.

Holmen technical Works.

Writing ink.
Diamond oil blacking.
Grease for leather.

(see No. 30).

Established 1872. Until 1875 the business was carried on by a share company under the name „Holmen technical works“; and since that time the manager has taken over the concern for his own account.

Employs 20 workmen and a steam engine.

The steam is condensed and used as distilled water in the manufacture of Ink and Amycos aseptine.

The only coloring matter employed is ivory black.

Market, chiefly the west and north parts of Norway; but also in the other coast districts of the southern parts, among the sea-faring and fishing population.

Vienna 1873	*honorable*	*notice.*
Drammen 1873 . . .	—	—

CLASS 203.

29. STEEN, Daniel, Christiania.

Essences, perfumery, pomades, cosmetics.

(see No. 26.)

Established 1860, manufacturer of Toilet-Soaps & Perfumery — The exhibited articles specified:

Royal Eau de Cologne, Toilet Vinegar, Eau de Lavande ambrée, Mogador, (Scenting Bouquet), Scenting Bags, Perfuming Papers, Tooth-Paste, Toilet-Soaps, Crystal Shaving Sticks.

Steen's Royal Eau de Cologne is highly appreciated, as well for its refreshing and reviving qualities as for its agreeable and exquisite perfume.

Large stoppered	bottles	Doll. G.	15.	pr.	doz.
Middle „	„	„	8.	„	„
Small	„	„	4.	„	„
Cut stoppered	„	„	12.	„	„

Steen's Toilet Vinegar is a very successful combination of select tonic and aromatic ingredients, which make the article indispensable for the ladies toilet. Doll. G. 4 pr. doz.

Steen's Amber Lavender Water is used for perfuming rooms by sprinkling a few drops on a hot plate. Doll. G. 4 pr. doz.

Steen's Scenting Bags will communicate a fine and lasting scent when put among articles of clothing. Doll. G. 3 pr. doz.

By moving Steen's Perfuming cards over a burning lamp or candle, the largest room will directly be agreeably perfumed. Doll. G. 1, 25 c. pr. doz.

Steen's Toilet Soaps are of a superior quality; particularly his Savon à la fleur d'Oranges is a beautiful preparation, which exhales the true smell of the orangeflower, just as in a garden. Doll. G. 3. pr. doz.

Steen's Tooth-Paste in small squares is used by touching it with a wet brush; it is excellent for cleansing and beautifying the teeth. Doll. G. 1. 25 c. pr. doz.

Steen's Crystal Shaving Sticks are with used either hot or cold water; they give a lasting and creamy lather, which does not dry on the skin. Doll. G. 1. 25 c. pr. Doz.

The prices are for goods free on board in Christiania.

30. FUGLESANG, G. R., Christiania.

Holmen technical Works.

Aseptine.

(see No. 28).

CLASS 204.

31. CHRISTIANIA MATCH-MANUFACTORY, Christiania.

Safety-matches.

Phosphorus matches.

32. DONS, Henrik, Christiania.

Matches from Bryn Match-Manufactory.

(see Cl. 642 & 656).

Bryn match-manufactory, the property of the exhibitor, was established 1872, is driven by steam power and occupies 70 workpeople permanent on the premises. Rest home industry. Partakes for the first time in an Exhibition.

33. FRØLICH, F. H., & SON, Christiania.

Safety percussion caps for Nitroglycerine compounds.

(see No. 35 & 87).

34. H. JØLSENS MATCH-MANUFACTY.

Disponent: A. Hiorth, Christiania.

Phosphorus matches.

Established 1866 with a working-staff of about 100 persons and a production of about 150 gross daily.

The works have twice been totally destroyed by fire and have each time been reconstructed on a much larger scale; so that at present the capacity of production is 12—1400 gross daily with a working-staff of 2—300 on the premises and 6—800 home work,

In 1874 the business was constituted as a share company with a capital of Spd. 60,000.

The manufactory is worked both by steam and water with a total effect of about 30 horse power, driving about 65 special machines.

The average earnings of a grown up laborer vary from 36 sk. to 1 Sp.; for a boy, from 12 sk. — 48 sk.; for a woman, 20—60 sk.; for a little girl, from 10 to 30 sk. per day; all work is paid for by contract, with free lodging and fuel for the work-people.

Library, school, medical attendance, religious service and voluntary mutual assistance fund.

Bronze-Medal Drammen 1873,
Medal of progress Vienna 1873.

35. LIADALENS COMPANY, Christiania.

F. H. Frølich & Son.

1. Collection of blasting-powder.
2. do. of Gun- & rifle-powder.
3. Mining cartridges.
4. Pyrolithe (safety-blasting-powder).

36. NITEDALS MATCH-MANUFACTORY, Christiania.

Safety matches.

Phosphorus matches.

The Nitedal match factory at Nitedal near Christiania was established in 1863 by I. L. Sundt, and was then the only match manufactory in Norway. After having succesfully overcome the difficulties which had ruined the former factories in Norway, the Nitedal factory was able already in 1865 to produce more than the consumption of the country, and to enter into competition on the world's market, where the products were appreciated so that the factory could be constantly extended. This success created competition, and Norway now numbers 27 match manufactories.

In 1874 the factory and the firm were purchased by an association constituted as a share company

Nitedal Match Factory, Christiania

with a paid up capital of 640,000 Kroner. For the extension of the business the company built in 1875 a new and larger factory at Christiania. The latter makes only phosphorus matches, while that in Nitedal now only supplies safety matches.

Nitedal match factory is the first match establishment in Norway, and is constantly extending its operations. It is in every respect able to hold its own against any competition.

The product, which is sold to South America, India and China, has been exhibited in

Stockholm in 1866
Paris - 1867

and in both places obtained medals. The factory has not been represented at other exhibitions.

CERAMICS, POTTERY, PORCELAIN, &c.

CLASS 206.

37. HOLMBOE, A. B. Havnen works pr. Christiania.

Bricks.

The Havnen works are situated about 2 miles from the centre of Christiania on the shore of the Akers river.

Established 1874.

Production about 3 millions of bricks annually.

CLASS 213.

38. SCHWARZENHORN, F. von, Christiania.

Painted and decorated porcelain.

The establishment of Mr. Schwarzenhorn for painting and decorating porcellain commenced 1859 and was the first in this country; originally it was based upon artificial painting only, but since 1862 it has been a wholesale business, the products of which are now spread all over the country.

GLASS AND GLASS-WARE.

CLASS 214—16.

39. BERG, Harald, Christiania.

Window-glass.
Pharmaceutical glass-ware.
Decorative glass-ware.
(see No. 44 & 46).

The Hurdal, Biri, Hadeland and Høvig Glassworks — Depot, Christiania Glassmagasine (Harald Berg) — manufacture:

1. Sheet window glass.
2. Beer- & wine-bottles, globular fishing net floats and larger oval corner floats.
3. All sorts of cut and uncut Glass goods for domestic use, as well in flint as in ordinary glass; also
4. Lamps.

The manufacture is divided as follows:

At the Hurdal glass works, window glass and oval floats; at Biri, bottles, round floats &c.; at Hadeland small glasses and lamps, and at Høvig, small glasses, bottles, round floats &c.

The 3 first-named works were established about the year 1760; the last in 1870. They are all situated in the neighborhood of Christiania.

Until 1854 the manufacture comprised only window glass and bottles; the small glass business not being taken up till this year at Hadeland, when the works had been taken over by the present owners.

Stockholm 1866. *Silver medal 1st class.*
Copenhagen 1872. « « - «
Drammen 1873. « « - «

and in 1874 *the Royal Prize Medal in Silver through the Society of industry and trade in Christiania.*

40. BERGEN GLASSWORKS, Bergen.

Glass-floats for fishing-nets.

FURNITURE AND OBJECTS OF GENERAL USE IN CONSTRUCTION AND IN DWELLINGS.

CLASS 217.

41. GRAM, W^M., Christiania.

Antique Buffet, bedstead, cup-boards &c.
(see Cl. No. 66 & 78).

42. HOLST, Chr.,
Head Steward to H. M. the King, Christiania.

Arm chairs.
Saloon chairs.
Buffet chairs.
} from the Royal Villa «Oscarshal».
(see Cl. 620).

43. KLEMETSEN, Chr., joiner, Christiania.

The fittings of the Norwegian Section.

CLASS 218.

44. BERG, Harald, Christiania Glassmagazine, Christiania.

Champagne-, Wine- & Ale-glasses, decanters &c.
(see No. 39 & 46).

CLASS 222.

45. DRAMMEN FOUNDRY & MECHANICAL WORKS,

Stoves.

The Drammen Iron Foundry was established on a small scale in the year 1818 and worked as a foundry until 1860 when a little mechanical work was begun. Burnt down in 1870. Was 6 months after taken up on a largor scale, and the mechanical traffic at the same time extended; the latter produces now agricultural machinery complote, machinery for steam-engines, turbines, water-wheels, mining machinery &c. The total capacity of production last year, about 100,000 Species-dollars of which about 30,000 in the mechanical department. The principal business is still casting of all kinds of articles, mostly Stoves, Kitcheners, Cooking-stoves &c.; every thing can be cast to order, also large castings, for which there are two cupola furnaces with necessary implements for large operations. A steam engine of 12 horse power and a steam hammer for larger forgings consume about 1000 tons of English pig iron and a corresponding quantity of cokes yearly. The works are situated on the shore of the Drammen fiord, and ships can lie alongside the quay which has shears 80 feet high to lift 15 tons. Permanent working staff 120 men living in two large workmen's dwellings belonging to the company near the premises. — Traffic-Manager Mr. P. E. Schmidt. Market, Norway and partly Sweden.

The works have participated in the following exhibitions:

Bronze-medal of the Technical Association,	Christiania	1857.
Honorable notice	Copenhagen	1872.
Silver medal	Drammen	1873.

CLASS 223.

46. BERG, Harald, Christiania Glassmagazine, Christiania.

Lamps.

(see No. 39 & 44).

CLASS 224.

47. NORD & SON, M. E., Christiania.

Refrigerator.

The Christiania Ice Magazine and manufactory of Refrigerators was established in 1854. It is the first establishment of that kind in Scandinavia. It was founded on the theory that every new traffic which at the same time promotes health, economy and comfort must succeed.

After the manufactory had commenced working, there were in use in Christiania

in 1859	3	Ice-chests
„ 1860	33	—
„ 1861	176	—
„ 1863	281	—
„ 1868	650	—
„ 1873	900	—
„ 1875	1300	—

During the last 10 years, there have also been sent Ice-chests to most of the towns and country districts in Norway; and moreover there have been sent a great many to Sweden and Denmark, in which countries people are at present not nearly so far advanced in the use of ice in domestic economy as in Norway.

Ice-chests are also exported from the factory to Germany, England, France, Russia, Spain, Italy, Turkey, Egypt and Australia, but not in large quantities, as duty and freight usually form obstacles to such traffic.

The total sale hitherto from the factory has amounted to 3500 Refrigerators, of which 99 % chests with lids, and only 1 % safes with doors.

The cost of ice for keeping food and liquids for an ordinary household in Christiania, need not exceed 4 cents per day during the 4 summer months.

The business has recently been considerably extended, and can now satisfy a much larger demand than has hitherto existed.

Besides distinctions in **Copenhagen** 1872 and **Drammen** 1873, M. E. Nord has obtained:

The silver medal of the Royal Society for the Welfare of Norway.

CLASS 225.

48. O. JACOBSONS MACHINEWORKS, Christiania.

Patent Mangling machine ¼ size.

CLASS 226.

49. BLUNCK, C., Christiania.

Water closets for ships.

(see Cl. 283 & 284).

CLASS 227.

50. ECHE & SON, J. D., Bergen.

Painted blinds.

(see No. 59).

YARNS AND WOVEN GOODS OF VEGETABLE MATERIALS.

CLASS 230.

51. NYDALENS COMPANY, Christiania.

Cotton yarns, plain & dyed.

Cotton fabrics, bleached & unbleached.

Shirtings and twills.

Cotton canvas and ducks.

(see No. 53).

The works of the Nydalens Company were established 1846 and have gradually grown to be the largest establishment for textile industry in Norway. It has 20,000 spindles and 4—500 looms for fancy and plain weaving, besides doubling & twining machinery for fishing-net-yarns, knittings &c., dying yarn & goods, bleaching &c. The works have developed themselves in accordance with the home consumption upon which they have hitherto been exclusively based, — hence also the variety of the manufactures. Annual consumption of cotton, some 3,500 bales. The mills are driven by 600 horse water power, and occupy about 700 work people, mostly living with their families in cottages belonging to the company. The establishment has its own school and several humanitary institutions.

Boulogne sur Mer	1866.	*Bronze medal.*
Stockholm	1866.	— —
Paris	1867.	— —
Tromsø	1870.	*First prize.*
Lysekihl	1870.	*Silver medal.*
Gothenburg	1871.	— —
Copenhagen	1872.	— —
Drammen	1873.	*2 Silver medals.*
Vienna	1873.	*Fortschritts Medaille.*

52. JEBSEN, P., & Co., Arne works, Bergen.

Domestics, bleached & unbleached.

Twill & Shirtings.

(see No. 54 & 60).

The Arne works were established 1846 and comprise Cotton spinning and weaving mills as well as cloth manufactory, the latter erected 1853. Number of spindles 10,000, looms for cotton 300 and for wool 100. They form one of the largest textile factories of Norway, occupy between 6 and 700 work people and are driven by 3 water wheels and 4 turbines representing together ca. 450 horse power. The manufactures are very various being calculated upon filling the various wants of the home consumption, and they are also sold exclusively in Norway, only with exception of a greater part of the cloth manufactures which is exported to Sweden.

Bronze medal	Paris 1867.
Silver medal	Copenhagen 1872.
Verdienst Medaille .	Vienna 1873.

CLASS 231.

53. NYDALENS COMPANY, Christiania.

Dyed cotton fabrics: Ginghams, Regattas, Ticks &c.

(see No. 51).

54. JEBSEN, P., & Co., Arne works, Bergen.

Dyed cotton fabrics: Ginghams, Regattas &c.

(see No. 52 & 60).

55. PETTERSEN, Gunerius, Christiania.

Dyed cotton fabrics.

(see No. 61 & 74).

The fabrication is altogether Home Industry, carried on partly in the country and partly in town.

Silver medal	Copenhagen	1872.
The Royal Prize-medal, through the Society for trade and industry	Christiania	1872.
Silver medal	Drammen	1873.
Verdienst Medaille	Vienna	1873.

CLASS 233.

56. CHRISTIANIA SAIL-CLOTH MANUFACTORY, Christiania.

Sail-cloth.

Fishing-yarns & twine.

Fishing-nets.

Established 1859. Situated on the Akers River Christiania.
Working staff, 600 persons.
Water power about 200 horse.
Steam „ „ 100 „
Manufactures sail-cloth, sack-cloth and fishing-net yarn of hemp.
Chief markets: Norway and Sweden.

Medal for general excellence especially regularity	London	1862.
Silver Medal	Boulogne	1866.
—	Stockholm	1866.
—	Paris	1867.
—	Denmark	1872.
—	Drammen	1873.
Medal for progress	Vienna	1873.

57. FAGERHEIM NET-COMP., Bergen.

Seine-net for herrings.
Salmon-seine.
Cod-net.
Herring-nets.
Mackerell-net.
Samples of herring-seines.

This factory, the only one in Norway which makes fishing nets mechanically, was established 1873 and is now working with 8 Jonannin machines, moved by steam power and occupying 24 work-people. Its produce amounted in 1875 to about 35000 Kilogrammes, worth about 30,000 Dollars.

Bronze-medal at the Exhibition of Viborg in Denmark 1875.
Silver-medal at the Exposition maritime at Paris 1875.

58. KRAASBY BROTHERS, Aalesund.

Snoods for fishing-lines.

CLASS 234,

59. ECHE & SON, J. D., Bergen.

Floor oil-cloths.
(see No. 50).

WOVEN AND FELTED GOODS OF WOOL AND MIXTURES OF WOOL.

CLASS 236—38.

60. JEBSEN, P., & Co., Arne works, Bergen.

Flannels, Pilots, Union cloths &c., Blankets.
(see No. 52 & 54).

61. PETTERSEN, Gunerius. Christiania.

Flannels,

Dress-goods for women's wear: Winseys &c.

(see No. 55 & 74).

CLOTHING, JEWELRY AND ORNAMENTS, TRAVELLING-EQUIPMENTS.

CLASS 250.

62. FALKENBERG, Johs., Christiania.

Ready made linen.

Business in ready made linen, established 1865, employs from 40 to 60 permanent sewers on the premises besides some 50 persons, who are occupied in their homes principally with embroidery and lace-work.

Stockholm	1866.	*Bronze medal.*
Paris	1867.	*Mention honorable.*
Copenhagen	1872.	*Bronze medal.*
Drammen	1873.	—

63. HOLMEN, Einar, Christiania.

Ready made linen.

CLASS 251.

64. NÆSS, H. S., Christiania.

Boots & shoes for Gentlemen.

— — for Ladies.

Established 1846. Occupies 25 work people. Home consumption only.

Stockholm	1866.	*Silver Medal.*
Paris	1867.	*Mention honorable.*

65. NORDAHL, P. N., Christiansand.

Top-boots.

Womens' walking-boots.

CLASS 253.

66. GRAM, Wm., dealer in antiquities, Christiania.

Collection of antique silver-ornaments worn upon the person.

(see No. 41 & 78).

67. **LIE, P. A.,** Christiania.

Collection of Silver filigree-work,
Silver drinking-horn,
Silver jug,
Norwegian style.

Established 1846. Present working staff 50, besides manager and clerks Manufacture calculated chiefly for inland consumption, but sent also to the markets of Sweden, Russia, Germany and England, where agents are appointed..

Special article Filigree silver-work.

Bronze medal at Copenhagen in 1872.
Silver medal at Drammen in 1873.

68. **OLSEN, Th.,** Bergen.

Collection of silver-ornaments & furniture.

69. **TOSTRUP, J.,** Christiania.

Silverwork. Speciality: Silver filigree-work in specific norwegian style.

The Royal silver prize medal "for having raised his profession in the direction of art," 1874.

Silver Medal,	Kristiania 1852.
Medal,	London 1862.
Silver medal,	Stockholm 1866.
Medal,	Paris 1867.
Silver medal,	Copenhagen 1872.
Fortschrittsmedaille,	Wien 1873.

From Reports of Artisans, selected by a committee, appointed by the council of the society of arts, London, to visit the universal Exhibition, Paris, 1867:

„Norway has an Exhibitor in Mr. Tostrup, Christiania, who has sent „a great variety of objects in silver: a vase, with a bouquet of well made „flowers and ferns, also in silver; a pair of claret-jugs, with Thorvaldsen's „bas-reliefs of the Four Seasons traced lightly on the body, only in outline, „without being raised, and having a very delicate effect; several dessert-stands, „a very good tea-set, and a great number of ornaments in filigree, excellently „done, and, as far as regards design, it was perhaps the best filigree-work „in the Exhibition."

Die Kunstindustrie auf der Wiener Weltausstellung 1873 von Jacob Falke, Director des K. K. Oesterreichischen Museums fur Kunst und Industrie, Wien:

„We see in Norway, by an example extremely instructive, how the „remains of national art are to be made useful to us. The filigree, though „realy a speciality of popular ornaments, existed until now in Norway „only in this form, but an intelligent goldsmith, Mr. Tostrup in Christi„ania, has tried to gain it for the modern world by means of refinements „and new drawings, without depriving it of its originality, and the approba„tion, gained by him, proves him to have already partly succeded, therein. „His exhibition, arranged in the circular centre, shows his mode of proceeding

„in making the drawings richer in style, more fixed and regular, and on the „other hand amplifying the genre; and in applying the filigree also to other „objects of luxury and use.“

CLASS 254.

70. LARSEN, G. Lillehammer.

Carved Meerschaum pipes.

71. PETTERSEN, Andreas, Bergen.

Wigs,
Pomatum and oils for the hair.

CLASS 255.

72. KITTELSEN, Jens, Christiania.

Valises.

73. NORWEGIAN TOURIST CLUB, Christiania.

Tourist Knapsack with some implements.
(see Cl. 306).

74. PETTERSEN, Gunerius, Christiania.

Valises (home-industry).
(see No. 55 & 61).

CLASS 256.

75. BRANDT, C., Bergen.

Collection of furs, floor-carpets, covers and skins.

London	1862.	*Medals.*
Paris	1867.	—
Copenhagen	1872.	*Silver medal.*
Drammen	1873.	—
Vienna	1873.	*The medal for good taste.*
Christiania	1873.	*The medal of honor from the Society of industry and trade.*

76. HENRIKSEN, J. H., Tromsø.

Fur-lining.

77. RUSTAD, A. S., Drammen.

Collection of Norwegian furs.

Business established in 1847 comprises all sorts of Furrier,s work and export of all sorts of Norwegian raw skins chiefly to England, Germany, Sweden, Denmark and France.

Mension honorable	Stockholm	1866.
Bronze medal	Paris	1867.
Verdienst-Medaille	Vienna	1873.

CLASS 257.

78. GRAM, Wm., Christiania.

National costumes from Hardanger with silver-ornaments.

(see No. 41 & 66).

79. FANDREM, O. C., Karasjok, Finmark.

Lapp-costumes.

Mittarbeiter-Medaille, Vienna 1873.

PAPER BLANK BOOKS, AND STATIONERY.

CLASS 259.

80. CHRISTOPHERSEN, CHR., Christiania.

Wood-pulp for paper-manufacturing from the *Vestfossen Woodpulp-manufactory*, in the various stages of production.

Erected in 1872. Driven by water power, Production 800 tons anually sold to England, Franee & Germany.

Diploma of honor in Vienna 1873.
Bronze medal in Drammen 1873.

81. VITTINGFOSSEN WOOD-PULP-MANUFACTORY, pr. Holmestrand.

Disponent: A. O. Haneborg, Christiania.

Wood-pulp for paper-manufacturing.

(see No. 82).

This factory commenced working 1873. It is situated about 15 miles from Holmestrand at Vittingfos, a waterfall of 50 feet perpendicular height, which at lowest water represents about 2000 effective horse-power. Of this, 500 horse power is used for the wood-pulp works, driving 6 vertical grinding apparatus which produce 6 tons raw pulp (with 50 % water) daily. The whole working staff is 20 men.

This wood-pulp has not previonsly been exhibited.

Part of the pulp is sold in Norway to the Tunnefos paper works owned by A. O. Haneborg who is also chief owner of this factory.

CLASS 260.

82. HANEBORG, A. O., Christiania.

Wrapping paper from Funnefos paper factory.

(see No. 81).

Funnefos Paper manufactory, the property of the exhibitor, is situated on the water-course of the Glommen near the Christiania—Kongsvinger railway.

Total power 250 horse.

1 paper machine producing about 3 tons paper daily.

In connexion with this manufactory is a wood-pulp factory with 4 vertical grindstones.

Total working staff 80 laborers.

The paper from this manufactory has not yet been publicly exhibited; as the works have only been in activity about 1 year.

The wood-pulp used is partly from these works, and partly also from Vittingfos.

The desire of turning to account the offal of the neighboring large forest tracts belonging to the exhibitor, occasioned the establishment of the wood-pulp factory to which the Funnefos paper manufactory was afterwards adjoined; and the latter consumes the pulp produced as well from this as from the Vittingfos wood-pulp works, of which also the exhibitor is chief proprietor.

83. MOESTUE, Thv. & Co., Christiania.

Paper bags.

(See No. 14, 85, 86 & 106).

84. OTTERELVENS PAPER-WORKS, pr. Christiansand.

Printing paper.

CLASS 261.

85. MOESTUE, Thv. & Co., Christiania.

Set of account books.

Ruling and binding of the same.

(See No. 14, 83, 86 & 106).

Established 1858.

3 lithographic steam printing machines.
4 — hand presses.

Manufactory of account books, bags, fire-proof safes and doors, weighing machines, counter scales &c.

The Factories employ 72 workmen.

Silver medal 1st class at the exhibition in Drammen 1873.

CLASS 263.

86. MOESTUE, Thv & Co., Christiania.

Asphalt paper for covering roofs.

(See No. 14, 83, 85 & 106).

CLASS 264.

87. FRØLICH, F. H. & SON, Christiania.

Paper hangings and borders.

(See No. 14).

MILITARY AND NAVAL ARMAMENTS, ORDNANCE, FIRE ARMS, AND HUNTING APPARATUS.

CLASS 267.

88. CATHRINEHOLMS IRON WORKS AND FOUNDRY, Fredrikshald.

Projectiles.

(See Cl. 111, 670).

MEDICINE, SURGERY, PROTHESIS.

CLASS 272.

89. BORDEWICH & Co., Lyngvær, Lofoten.

Pure medicinal cod-liver-oil.

(See Cl. 646).

90. BORTHEN, T. M., Trondhjem.

Pure medicinal cod-liver-oil.

91. DEVOLD, Lauritz, Aalesund.

Pure medicinal cod-liver-oil.

92. DITTEN, H. S., Court-Apothecary, Christiania.

1. Ditten's aperient, tonic pills.
2. Tourist pharmacies.

„Ditten's pills" have never before been sent to any exhibition; but the Tourist pharmacies were exhibited in

Vienna 1873

and obtained Anerkennungs-Diplom.

93. HANSSEN, Fred., Aalesund.

Pure medicinal cod-liver-oil.

94. HENRIKSEN, J. H., Tromsø.

Pure medicinal cod-liver-oil.

95. HOEL, P. C., Aalesund.

Pure medicinal cod-liver-oil.

96. JORDAN, C., Trondhjem.

Pure medicinal cod-liver-oil.

97. MØLLER, Peter, Christiania & London, Oxford St. 521
Sole Agents for the United States, Canada
and Mexico:
W. U. Schieffelin & Co.,
170—172 William St., New-York.

Peter Møller's Cod-Liver Oil is prepared according to the method invented and introduced by him 1853. This oil has received the following rewards at several exhibitions for purity, palatablenes and general excellence.

1862: *London*, International Exhibition: The Only Medal.
1865: *Bergen*, *Norway*, International Exhibition: The Gold Medal: Royal Society for the Welfare of Norway.
1866: *Stockholm*, *Sweden*, Great Scandinavian Exhibition: The only First Prize.
1866: *Boulogne*, *France*, International Exhibition: The great Silver Medal.
1867: *Paris*, International Exhibition: The Only First Prize.
1871: *Christiania*, *Norway*, National Exhibition: The Only First Prize.
1871: *Naples*, *Italy*: International Maritime Exhibition: The Only Medal.
1871: *Copenhagen*, *Denmark*, Great Scandinavian Exhibition: The Only First Prize.
1872: *Moscow*, *Russia*, International Polytechnic Exhibition: The Only Medal.
1873: *Drammen*, *Norway*, The greatist Norwegian Exhibition: The Only First Prize.
1873: *Vienna*, *Austria*, International Exhibition: The Only Medal »For Progress« for the superiority of Peter Møllers method of extracting Cod-Liver Oil and the Medal »Of merit« for the excellence of the oil.

Peter Møller has, in addition, received personal distinctions at the hands of H. M. the King of Sweden & Norway, who conferred upon him the Swedish order of Knighthood of Vasa and the Norwegian Order of Knighthood of St. Olaf for his services in promoting an important branch of National industry.

Peter Møller's manufactories for the preparation of cod liver oil are situated in the islands of Lofoten: one at Kabelvaag, another at Stamsund eastwards and westwards of the centre of the fishing grounds there. These manufactories are worked by steam power and have in operation 18 boilers capable of producing — under favorable circumstances — 2000 to 3000 barrels of oil, giving employment during the busiest parts of the season to upwards of 30 men.

When the oil is extracted and filled into barrels of tin or galvanized iron, it is at once sent to Christiania, where the bottling process takes place at the extensive establishment fitted up for that purpose. Chiefly girls are employed in this work, the number varying considerably according to the season and to the press of business.

The oil is prepared exclusively according to the method originally devised by Peter Møller. As is often the case with new inventions, his claim to be the originator of the principle upon which the method is based has been disputed, the oldest claimant appearing even as early as the year after Peter Møller had conceived his idea. In order therefore to establish his claim to the invention by testimonials of undoubted authority, Peter Møller applied to the Norwegian Government for a patent for his new method. This application was made, not with the view of its being granted, because according to the very stringent rules in Norway no invention, the details of which have already been published, can obtain protection by letters patent. Now, Peter Møller in harmony with his principles had made no secret of his ideas and had even communicated them to a person at Hammerfest who immediately published them as his own. Mr. Møller's object was therefore not to obtain a patent — which he knew could not be granted — but solely to cause an investigation by the public authorities into the case. And the Government report, of which the following is the conclusion, clearly proves to whom the merit of the invention belongs:

,,Mr. Møller being therefore the real inventor of the aforesaid method, there would be no objection to granting him a patent, if the Norwegian patent laws did not prohibit such a grant to inventions that have — with or without the permission of the inventor — been already made public and thereby open to appropriation by others before the application for a patent has been presented. The application can therefore not be granted. At the request of Mr. Møller this official certificate is given.

M. LAMBRECHTS
Chief of the Home Departement under the
Royal Government of Norway.

Peter Møller's manufactories were first established in the winter 1852—1853 in the neighborhood of Aalesund, Søndmøre, Norway, on a small scale and continued there for some years, until the increased demand required additional works, for which purpose the locality of Lofoten was selected, because the supply of raw material is there practically unlimited. Very soon experience taught that the oil from the Lofoten cod fish was richer and generally preferred by customers, and the works near Aalesund were then entirely given up and transferred to Kabelvaag in Vaagenøen (one of the Lofoten islands). In order to keep pace with the demand for Møller's Cod-Liver Oil, new works were afterwards built at Stamsund on the opposite side of the fishing centre, thus always commanding a plentiful supply of livers; the fish curiously enough not concentrating themselves every season in equal abundance in the same localities; these fluctuations seem to be regular and periodical. For several seasons they abound more to the west; then they shift over to the east for a similar period & vice versa. A third manufactory at Gulvig was acquired by purchase; but its situation has proved to be inconvenient.

HARDWARE, EDGE TOOLS, CUTLERY AND METALLIC PRODUCTS.

CLASS 280.

98. BLUNCK, C., Christiania.

Augers.

(See No. 49, 102 & 103).

CLASS 281.

99. BLIKSTAD, H. N., Trondhjem.

Cutlery.

100. MICHELSEN, John, B., Bergen.

Collection of Knives with carved handles of walrus teeth & wood.

101. NORWEGIAN TOURIST CLUB, Christiania.

National Knives (commonly worn by tourists in Norway).

(See No. 73 & 122).

CLASS 283.

102. BLUNCK, C., Christiania.

Gun metal water gauges.

Steam valves.

Steam cocks.

Steam Joints &c.

(See No. 49, 98 & 103).

Established 1852. — Manufacturing staff in 1875, 70 a 75 workpeople
One steam engine (10 horse-power).
18 Turning lathes.
1 Rasping machine.
2 Screw machines.
5 Boring machines.
1 Planing machine.

Quantity of metal cast, and wrought up in 1875, 45,000 pounds.

Market of consumption chiefly Norway, partly also Sweden and Denmark.

The manufactures obtained distinction at the Exhibition in Copenhagen 1872, in Drammen 1873, not represented at other Exhibitions.

CLASS 284.

103. BLUNCK, C., Christiania.

Cast iron Fountain.

Cast iron pumps.

Fire engine.

(see No. 49, 98 & 102).

104. CHRISTIANIA DOOR-HANDLE WORKS, Christiania.

Door-handles.

105. KROGSTAD SOCIETY, Drammen.

Nails and spikes, machine-made by hot and cold process.

Rolled iron plates.

The business of the Krogstad share company is a continuation of a manufacturing business which Mr. Frantz F. Meelhuus commenced in 1830—40 in Krogstadelven in the parish of Eker about 6 miles from Drammen. It embraced at first only the manufacture of hooks and eyes, needles, wire, brass netting and the like; but this was removed to Drammen, and only the nail-factory remained in Krogstadelven.

In 1844 the first machines were imported from England; afterwards they were made at the factory itself. Rolling works were built for rolling the iron used in making the nails, which until 1860 were only made from iron in a cold state (nut nails) from 4″ to ¼″.

At the same time machines were procured for the manufacture of nails by warm process, for which branch some years afterwards, new special factory buildings were erected. During the last 10 years the Krogstad share company has manufactured and still contiuues to manufacture machine-forged and cut nails for building and ships' use from 10″ to ¼″. Ships' nails also hand-forged, for which purpose there are 6 hammers driven by water power. Manufacture of bar iron for home use, plate-rolling works, galvanising workshop, foundry for home service &c. &c. besides a mill for rasping and grinding of dye woods, which last industry has been carried on for more than 40 years by the owners of the establishment.

The water power employed is nearly 200 nominal horse-power, and the number of workmen, of whom the large majority are married people, is about 150.

At the **exhibition in Stockholm** the share company obtained the bronze medal for nails and a diploma of honor for ground dye wood. The company had exhibited also here in **Drammen in 1873**, but placed itself „hors de concurrence"; as the manager of the firm was also chairman of the exhibition committee.

106. MOESTUE, Thv., & Co., Christiania.

Iron Safe.

(See No. 14, 83, 85 & 86).

107. OPSAHL, P. J., Christiania.

1. Iron Safes.
2. Collection of locks.

108. VULCAN FOUNDRY & MECHANICAL WORKS, Christiania.

Iron Safe.

FABRICS OF VEGETABLE, ANIMAL OR MINERAL MATERIALS.

CLASS 287.

109. FREDRIKSVÆRN ROPERY, Fredriksværn.

Ropes.

Frederiksværn's Rope-walk situated at Frederiksværn, where it has its office, is owned by a share-company and managed by Mr. Henning L. Thoresen, Christiania and Mr. R. I. Brønlund, Porsgrund. The factory which formerly belonged to the state, has been carried on for account of the share-company since 1872. It employs about 45 men, also a steam engine of 12 horse-power. The production has been about Sp. 60,000 annually, and furnishes the cordage required by the Norwegian fleet, which with respect to strength has obtained the greatest appreciation. As instances of this it may be remarked that the average strength of the cordage received by the fleet from the factory in 1875 was:

For 3 inch rope 10,185 Pd. (Norwegian weight).
„ 2¾ „ „ 8.245 „ „ „
„ 2¼ „ „ 6,790 „ „ „
„ 2 „ „ 4,365 „ „ „

calculated respectively according to 63, 51, 42 and 27 threads in each of the ropes, at 3¼ Pd. for a leugth of 155 fathoms, or per thread in complete cable 161$^{3}|_{5}$ Pd.

CLASS 289.

110. KÜHNE, W., Christiania.

Basket ware.

Established 1858. — Sale Sp. 7,000 a 8000 annually. Chief market Norway. Some export trade mostly to England.
Obtained a prize at the Exhibition in **London 1862.**
At the Scandinavian Exhibition in **Stockholm 1866.**
At the northern Exhibition at **Copenhagen 1872.**
and at the Norwegian Exhibition at **Drammen 1873.**

CARRIAGES, VEHICLES AND ACCESSORIES

CLASS 293.

111. CHRISTENSEN, Chr., Christiania.

Karriol (Norwegian travelling carriage).

(See No. 114).

Builder of carriages & sledges; established 1864.
Working staff 25 men.
Market, Norway, England, Holland, Germany, Sweden and Denmark.
Medal at the Exhibition in Stockholm 1866.
Not represented at other Exhibitions.

112. HEFFERMEHL, L., Drammen.

Karriol (Norwegian travelling carriage).

(See No. 116).

Builder of Carriages & Sledges; established 1846. Depot Drammen and Christiania.

Carriages (Karriols) occasionally exported to Sweden, Denmark, Finland, Germany, England, France, America and Australia.

Working staff from 4 to 16 persons.

Bronze medal at Stockholm in 1866.

Honorable notice at Copenhagen in 1872.

113. SØRENSEN & KLØVSTAD, Christiania.

Karriol (Norweg. travelling carriage).

(See No. 117).

CLASS 295.

114. CHRISTENSEN, Chr., Christiania.

Travelling- and racing sledge.

Antique sledge.

(See No. 111).

115. FALCK-YTTER, Christiania.

Norwegian ice-fishing-sled with basket (seat).

Propelling sticks.

The ordinary snow shoes of the country for speed («Ski«).

The broad snow shoes, for support on deep snow (Truger).

Vienna 1873: *Anerkennungsdiplom.*

116. HEFFERMEHL, L., Drammen.

Travelling- & racing-sledge.

(See No. 112).

117. SØRENSEN & KLØVSTAD, Christiania.

Travelling- & racing-sledge.

(See No. 113).

DEPARTMENT III.

EDUCATION AND SCIENCE.

According to law, every child is bound to attend School (from the age of 8 in the country and from the age of 7 in the town until the 16th year (confirmation). If the parents do not themselves take care that their children receive instruction in religion and in the branches of secular education as prescribed by law, the children are in this respect provided for at the communal schools, where instruction is given gratis in reading, in Christian knowledge, Geography, history, physical science, writing, arithmetic and singing as obligatory studies; while it is moreover optional for the authorities concerned (the school-committee) to include in the programme of study gymnastics and military exercises, as also needle work &c. for females.

The country districts are divided into school communes: the larger, which coincide with the bailiwicks, and the smaller, which usually answer to the district-communes.

In the bailiwick communes, which receive subsidies from the public funds according to certain rules fixed by law, a part of the teachers' salary (supplementary for age) is paid out of such funds, whence also contributions are granted to the smaller communes for various purposes.

The number of the bailiwick communes is 18. The school communes, the number of which is 585, are divided into 6,381 school circuits, of which 4,470 have permanent schools, while schools are held by visitant teachers at the farms in 1,911 circuits. Every child has to attend school during at least 9—12 weeks yearly. The number of children under such obligation was in 1874, 215,768 of whom 175,073 received instruction in permanent schools, 32,785 in circuit schools, while 3,345 were educated out of the communal schools: 4,001 children were entirely absent from school. The number of teachers was 2,781 with a total salary of 445,822 Spd. including payments in kind 84,184 Spd. Besides the lower communal schools, there are in the country higher communal schools which give somewhat more extended instruction in the usual branches of study and in some others. The number of these schools is 21, and the most of them are supported to some extent by the public funds.

For the instruction of the youth of both sexes who have gone through the communal schools in the country districts, there were in 1875 established district schools and evening schools. These schools give such instruction in the several branches of secular education as may be useful and necessary, as well in practical private life, as for participation in matters of public (communal and political) interest. The expenses of these schools are defrayed mostly by the bailiwick communes, by contributions from the public treasury, whence in 1875 there was granted for this purpose a sum of 12,000 Spd; while the Storthing has this year granted 45,000 Spd. In 1875 there was established about 1 district school in each bailiwick, and one evening school in each parish. With essentially the same programme, private schools have already existed for several years, the so-called people's high schools.

Each town forms a school commune. In the 60 towns of the land there were in 1875, 52,947 children under obligation to frequent school, of whom 27,045 boys and 25,902 girls. Of these 35,270 (18,244 boys and 17,026 girls) received instruction in the communal schools, while 13,244 (7,026 boys and 6,218 girls) were instructed in higher schools. The remainder, within about 500 who received no instruction (chiefly abnormal children) were instructed in private schools, the teaching of which did not exceed the communal school standard.

In the communal schools of the towns, instruction is given daily all the year round (about 40—44 weeks). Every child must, according to law, have access to school at least 2 days weekly. Usually school is held 6 or 3 days weekly according to the age.

School was held in 117 school houses and was divided into about 1,013 classes or sections. The number of teachers was 349, of female teachers 313, with salaries respectively 105,900 Spd. and 48,899 Spd.

The total expenses of the towns for the communal schools amounted to 198,625 Spd., the greater part of which was paid out of the communal funds.

As in the country, there are also in many towns higher communal schools the instruction of which goes somewhat further. The teachers of the communal schools are trained usually in 6 larger and 6 smaller seminaries, the course of instruction lasting from 1½ to 2 years.

Of public schools (state schools) for higher general education, there are 16, of which 4 include the middle school with Latin and Real-gymnasium, while 3 are only middle schools. The course of instruction is 6 years in the middle schools (from 9 to 15 years) and 3 years in each of the gymnasia. The number of pupils in these schools was 3000; that of the permanent teachers 175. The expenses of the public schools were 120,272 Sp., of which 92,392 applied to payment of teachers' salaries. Of the expenses, 47.903 Spd. was paid by contribution from the state treasury, 9360 by contribution from the communes interested and 35.914 by school money. Of the communal higher schools, (of which in 1870 there were 35 with 2634 pupils and an expense of 45785), 10, which had in 1875 been organised as middle schools, had a subsidy from the state treasury of 5500 Spd.

Of private schools there were in 1870, 124 with a total number of pupils of 5012 (girls and boys). 3 of these private schools where organised as middle schools with Latin and Real-gymnasium.

Of the communal and private schools, 10 had the right to hold the examination for demission from middle schools with the same effect as the public schools.

There is 1 University in Christiania with about 1000 students, and 50 professors who teach Theology, Jurisprudence, Medicine, historical, philosophical, mathematical and physical science &c.

A library containing 200,000 volumes belongs to the University, and moreover 1 cabinet of coins, 1 collection of northern antiquities, 1 ethnographical, 1 zoological and 1 anatomical museum, 1 collection of physiological apparatus, 1 pharmacological museum, 1 collection of surgical and 1 of obstetrical instruments, 1 botanical museum, 1 mineralogical cabinet, chemical and metallurgical laborataries, 1 physiological institution, 1 technological collection of models and a collection of physical instruments. In connection with the university, there is a botanical garden, 1 astronomical observatory, and a mineralogical institution.

Of special schools there are 4 technical schools, 1 mining school, 1 upper and several smaller agricultural schools and 1 commercial gymnasium.

In most larger towns there are public seamen's schools, as also drawing schools. For the education of officers there is 1 military cadet academy, 1 naval cadet institution and 1 military high school. For the eduction of subaltern officers, there are schools in the larger garrisoned places (5).

For the deaf and dumb there is a decent institution at at Trondhjem and 3 private institutions with subsidies from the state. In these institutions there are about 239 children instructed, partly by means of sound, the speaking method, partly according to the sign-method.

For the instruction of the blind, there is a private institution in Christiania with about 40 pupils. Several private societies work for the promotion of general useful knowledge and accomplishments, partly without, and partly with contribution from the public treasury, such as the «society for the welfare of the Kingdom of Norway» which chiefly attends to improvements and progress in matters connected with agricultural economy; «the society for promoting the enlightenment of the poeple»; «the historical association», and many others, which all work by means of periodical publications.

As institutions working for the progress of science, we may name, besides the university, the scientific society in Christiania; the royal scientific society in Throndhjem; the association for the conservation of monuments of antiquity, and several associations for special scientific objects. These societies work partly by giving out publications. In connection herewith, we may also mention as auxiliaries to the advancement of science, the museums in Bergen and Tromsø. The geographical and hydrographical boards of survey are of more practical importance. These institutions attend to the production and issue of maps and sea- and coast-charts.

EDUCATIONAL SYSTEMS, METHODS, AND LIBRARIES.

CLASS 300.

118. BERGEN SCHOOL-BOARD, Bergen.

Desks, with benches for a class (35 scholars).

Black-board.

id. on foot, for maps.

Letter-case with letters.

Armillary sphere used by teaching geography.

Professor's chair (cathedra).

Maps.

Writing books of scholars in different ages.

119. SANDBERG, Andreas, Cand. mag., Christiania.

Models of hand-writing.

The view of these models of handwriting has been to combine a practical fluent style with every reasonable claim to beauty and neatness, and to accustom the pupils to such practical style from the very commencement of their education.

These models have been only recently published, but are already in extensive use not only in private, but also in the State schools of the country.

CLASS 305.

120. THE STATISTICAL BUREAU, Christiania.

1. Collection of official statistical publications relating to Norway.
2. Collection of Cartographical representations.

The statistical Bureau was established in the year 1837.

From the 1 July 1876 it will form a complete institution with a Budget, which for the term 1 July 1876 — 1 July 1877 is fixed at 13,070 Spd., of which 3,570 Spd. to the functionaries of the Bureau. In this amount there are not included the sums granted for extraordinary labor (in taking the census &c.)

The permanent staff consists of 12 men, but besides these there are employed at present 64 extra men and 66 women, chiefly in contract work.

The principal branches of statistics treated in the statistical Bureau are the following: Statistics of population, agriculture, cattle-raising, fishery, industry, mining, trade and navigation; also political economy and communal finance. In other government offices there are elaborated the school, pauper, and medical statistics, those of bankruptcy, inheritance and repartition, criminal statistics, railway statistics, telegraph-post-statistics, statistics of the state-finances &c.

CLASS 306.

121. BENTZEN, B. M., printer & publisher, Christiania.

Books in the Icelandic, Russian and Norwegian languages.

Color- and wood-cut printing.

Scientific and mercantile works in typographical and lithographical print.

Established 1859. Was the first 5 years occupied principally with his own publications, afterwards almost exclusively with orders. Working staff 17 men; five presses of which 3 printing machines of German and American construction. In the office, which has been rather appreciated for elegant and tasteful work, has lately been printed:

Russian grammar, the first work in the Russian language, printed in Scandinavia.

Old Icelandic Sagas, printed for the University.

The International System of Signals, printed for the Norwegian and Danish government containing a collection of engravings in colored print.

122. BOECK, W. and D. C. DANIELSSEN, Christiania & Bergen.

Recueil d'observations sur les maladies de la peau.

123. DANIELSSEN, D. C. and W. BOECK, Christiania & Bergen.

Traité de la «Spedalskhed» ou Eléphantiasis des Grecs, avec 24 planches coloriées.

124. JENSEN, H. J., printer and publisher, Christiania.

Illustrated papers (The Norwegian Illustrated News) and books.

125. SCHÜBELER, F. C., Dr., Professor of Botany at the University of Christiania.

Die Pflanzenwelt Norwegens.

The author has here endeavored to give a correct representation founded on 25 years' observation and experimental culture of the vegetation of Norway.

The experimental cultivation which includes the trees, shrubs and herbaceous plants applicable both to use and ornament, which are dispersed even to the extreme limits of the land towards north and east, has given a number of results especially interesting for botanical geography, showing that there is no country in the world which in the same degree of latitude has so favorable a climate for vegetation as Norway.

To the description of several of the cultivated plants, there is added some historical information which not unfrequently goes back as far as the introduction of Christianity into Nowray about the year 1000; and as far as is known, this is the first attempt which has been made to elucidate this part of the history of cultivation in Norway.

In order to facilitate the botanico-geographical synopsis of the results communicated in the work here mentioned, the same author has likewise exhibited:

A botanico-geographical map of the Kingdom of Norway.

It might perhaps have been expected that the extension of the most important plants and their occurrence within the limits of the country, would have been found indicated by means of curves, colors or other usual geographical marks. But the whole country consists of very high mountain masses intersected by deep and narrow valleys, in which latter the inhabitants dwell for the greater part. The configuration of the country prohibits therefore, as regards the distribution of the plants, any graphical representation if it is to be consistent with truth. The author has preferred to give an alphabetical catalogue of about 2000 species of wild and cultivated plants with their polar limits hitherto known. The former are indicated by w; and the latter by c. The works here mentioned are not in the trade.

126. THE NORWEGIAN TOURIST-CLUB, Christiania.

Annual reports, treatises and maps.

(see No. 73 & 101).

SCIENTIFIC AND PHILOSOPHICAL INSTRUMENTS AND METHODS.

CLASS 320.

127. WEDEL-JARLSBERG, Ferd., Commodore of the Norwegian Navy, Christiania.

Cabin control compass.

Steering control compass.

Corrective compass.

Log-machine.

System of night signals.

The control compass registers the course steered every five minutes or more frequently.

When the instrument is to be used, it is placed on board with the north point exactly forward; the ship's keel lying due north and south. The magnetic needle is put in its place and the watch wound up. The tube on the watch is filled with balls, which one by one are taken up in the hollows of the wheel and carried along with it as it turns to the hole in the lid, through which they fall into the tube on the magnetic needle and thence into the space under it.

The course is indicaetd by the north end of the magnetic needle, not by a steering mark, and the course steered may be read off at once from the partitions, according to the number of balls found there.

The control compass obtained the great silver medal at **Stockholm** and the bronze medal in **Paris**.

Corrective compass.

The object of this instrument is to correct courses and bearings for deviation, so as to avoid mistakes in the reduction.

When the ship's compass deviation is known, it is easy to discover:

1. What is the general compass-course when a particular ship's compass course is steered.

To ascertain this, place the north of the upper card (which represents the north of the ship's compass) as many degrees or fractionary points east or west of the north on the under card (which represents the generalcompas north) as the course steered or to be steered has deviation, and screw the upper card fast. Then place the steering mark (on the hand) in one with ship's compass course. The extreme point of the steering mark will then indicate on the under card the general compass course steered or to be steered.

Is is equally easy to ascertain:

2. What deviating (ship's compass) course is to be steered in order to advance in any general compass course required.
3. What is the general compass bearing in which an object is taken by a compass that has deviation.
4. What bearing shall be indicated by the ship's compass in order to have an object or place in a given general compass direction in a fixed course.

New Patent Logmachine.

This Instrument consists of a hollow metal cylinder which has a bottom near one end, and is fixed by a claw to one end of a chain the other end of which travels in a tube, and which, near the upper end, has a piston resting on one or more springs inclosed in a spring-box fastened to the tube. One or more vertical openings are made in the tube, and at the lowest extremity there are 2 rollers. On the rod, accordingly as the speed is to be read off in one or in several places, an indicator or several indicators may be attached, each of which points to a scale on the tube at the openings. A scale is also placed over the spring box and the rod continued upward through the lid where it moves in a glass tube with a scale, the end of the rod acting as an indicator.

The log instrument is arranged in a tube which for that purpose is made to go through the ship's bottom in some convenient place. This tube is furnished with diaphragms to keep the log instrument in its place, so that the rollers lie with their sides in a line with the keel and a few inches under the ship's bottom.

When the ship is at rest the metal cylinder will hang straight down, and the upper end of the rod and the other indicators point to zero, but when the ship begins to move, the water will press the cylinder in a contrary direction, forcing it to draw the metal rod downwards.

If the ship lies at anchor in a stream, the rapidity of the stream will be indicated in like manner.

CLASS 321.

128. PETERSSON, A. J., Christiania.

Calculating-machine for addition, subtraction, multiplication and division.

This is a handy little machine, provided with every convenience for solving arithmetical problems, but more specially designed for daily use in bankers' merchant's and engeneers' offices, as it saves time and relieves the mind from the extra exertion which presses so heavily in the case of the continued strain through mere arithmetical matter.

In fact the inventor, who is also the exhibitor, when designing the machine in 1871 had his attention specially directed to produce a machine of convenient proportions and easy working, which would be little liable to get out of order, with a motion accompanied by a minimum of noise, and at a moderate price.

How far, and by what means beyond a great reduction in the number of component parts, this end has been attained, must be reserved for a special report.

The machine works with 6 times 6 figures, in all 12 cyphers, and is provided with Efacer and Quotient. Price £ 8. Quantity manufactured at present 40 machines.

CLASS 322.

129. ADJUSTER OF WEIGHTS AND MEASURES, Christiania.

Standard weights and measures of Norway.

130. MOESTUE Thv., & Co., Christiania.

Counter-scale.

(see No. 14, 83, 85 & 106).

CLASS 327.

131. AARESTRUP, J., Bergen.

Piano.

132. BRANTZEG, P., Christiania.

3 Pianos.

Manufacturer of Organs, Pianos, Physharmonicas and Acoustic Instruments. Established 1850. Employs 22 men.

Stockholm 1866.	*2nd class medal, and Diploma of honor.*
Copenhagen 1872.	*1st class medal.*
Drammen 1873.	*2nd class medal.*

ENGINEERING, ARCHITECTURE, CHARTS, MAPS, AND GRAPHIC REPRESENTATIONS.

CLASS 330.

133. DIRECTOR OF THE PUBLIC ROADS OF NORWAY, Christiania.

Books, drawings and maps of the roads of Norway.

(see No. 135).

Specification.

B. C. D. Drawings, sketches and photographs of the roads in Norway (2 vol. and 1 album).

E, F. Detail project of a new road (2 vol.).
C. H. Provisional project of a new road (2 vol.).
J. Tables with regard to the calculation and the constructions of new roads.
K. A graphic illustration of the calculation of transport.
L. Album, containing different models, printed forms &c.
M. Drawing of tools employed in the construction of roads.
N. Road budget of the years 1872 and 1874.
O. Alphabetic list (in Norwegian and English) of the words which occur most frequently in the documents,

The objects exhibited represent the system elaborated for the roads of the country before 1851 by the late Director of the public roads, the defunct Major Bergh. This system has been exhibited:

London	1862.	*Medal „honoris causa.“*
Copenhagen	1872.	*Silver medal.*
Vienna	1873.	*Medal of merit.*

CLASS 335.

134. COLLET, Robert, Christiania.

Zoo-geographical map of Norway containing a complete list of the vertebrated animals of the country.

135. DIRECTOR OF THE PUBLIC ROADS OF NORWAY, Christiania.

1. General mural map of Norway shewing the progress of the ways of communication.
2. Map of Europe indicating the population of its different parts.

The map of the population of Europe has recently been elaborated upon the plan of the late Major Bergh but subsequently to his death.

136. GEOGRAPHICAL SURVEY OF NORWAY, Christiania.

Maps.

137. GEOLOGICAL SURVEY OF SOUTHERN NORWAY.

Director: Th. Kjerulf, Christiania.

Geological maps and sections. (see No. 3).

138. PETTERSEN, Karl, Tromsø.

Geological map of the northern part of Norway with description.

139. SCHÜBELER, F. C., Dr., Professor of Botany at the University of Christiania.

Botanico-geographical map of Norway.
(see No. 125).

PHYSICAL, SOCIAL, AND MORAL CONDITION OF MAN.

CLASS 342.

140. THE MUSEUM OF BERGEN, Bergen.

Model of fishermen's houses in Lofoten.
(see Cl. 594, 640 & following).

CLASS 344.

141. THE ROYAL MINT, Kongsberg.

Collection of current coins of the new decimal system.

NORWAY.

ART OF THE PRESENT TIME.

HISTORICAL VIEW.

When in 1814 the foundation of the present constitution of the kingdom of Norway was laid, and when the Norwegian state thus entered upon a new historical period, Art in Norway had not yet been developed in any particular national direction.*) Norway possessed af that time neither educational establishments for art nor indeed any one of those institutions which are essential to all independent artistic development. Although the strongly marked features of the popular temper and character could even at a very early period introduce new and fresh elements into the Danish-Norwegian literature, the manifestation of these powers in the domain of art, was necessarily delayed for a considerable time by the force of circumstances.

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*) The few artists who up to that time had worked in the country, were in this respect without importance. In the 17th century, *Salomon von Haven* († 1836 in Bergen) was mentioned. Afterwards, in the beginning and in the middle of the last century, there lived the historical painter *Blumenthal*, the portrait painter *Thornberg* and the figure painter *Peder Odnæs* a talented self educated artist. About the same time, there appeared the subsequently better known sculptor *Magnus Berg* (born 1666 † 1739) several of whose works are now in the art-collections at Copenhagen.

In the first period after 1814, in which the foundation was laid for so much that is important in the spheres of legislation and political economy, and in which scientific and literary labors had already begun to yield results, the interests of art stood yet in the back ground. In 1819 the first public school of art was founded in Christiania; and subsequently other similar institutions arose in the country, but with the intention of forming practical technists and artisans, rather than artists. These elementary institutions were however not without importance for art; as several of our more eminent later painters received through them their first stimulus and preparatory culture.

As an instance of the noble powers which had been lying dormant, there arose just at this period two artists who both struggled through difficult circumstances, and both became eminent by remarkable talent, though according to the result of their labors, they had by no means equal influence; we mean the landscape painter professor *Dahl*, and the sculptor *Michelsen.*

Dahl, Johan Christian was born in Bergen in 1788 of, poor parents, and was at an early age apprenticed to an artisan. His artistic talent soon attracted attention; the benevolence of his fellow citizens enabled him to visit the academy in Copenhagen. His large landscapes, with subjects taken from the then nearly unknown natural scenery of his native country, which first appeared in 1814, excited extraordinary attention. His reputation was already in 1820 so great that he was called to the position of professor at the academy of Dresden. His long and active artist's life was henceforth consecrated to the new home, where — at a time when landscape-painting was shaping new and healthier courses — he brought a powerful hand to bear in the development of his art, and maintained his place for more than a generation among the most eminent masters of his time. The most essential points in Dahl's artistic labor are his northern nationality and the freshness of his subjects derived from constant visits to his native country. Thereby his art acquired also for Norway an extraordinary importance; and he himself devoted to the awaking artistic interests an indefatigable sympathy and fostering care. A great number of Dahl's later works are in Norwegian private and public collections. Dahl died in 1857 at Dresden.

A peasants house in a remote village of the province of Trondhjem, was the place of *Hans Michelsen's* birth in 1789. As in many of the Norwegian mountain regions, woodcarving was also in his home a much cultivated accomplishment. The works of young Michelsen procured for him the assistance requisite to enable him to obtain instruction in modelling, at Stockholm. Here he made such progress as betokened extraordinary talents. With assistance of a public stipend, he studied from 1820 under *Thorvaldsen* at Rome. During these years he excecuted several important works, and in 1833, in excecution of an order from King Carl Johan, he produced his master piece, the statues of the 12 Apostles. This work which the King presented to the cathedral at Throndhjem, shews rare talent and deep study and would alone suffice to save his name from oblivion. In spite of the high reputation which he had acquired, he was unable to gain for himself an independent position as an artist, and after many trials, he had to retire discouraged and infirm to his peasant's home and life. After the lapse of many years, an attempt was made by means of a national subscription to rescue him from this half forgotten existence, securing to him a series of orders and a position in life free from care. He produced also during this period a number of works; but his strength was gone, and his later works did not correspond to his early productions. He died in Christiania 1859.

Among the Norwegian painters, *Thomas Fearnley* (born in Fredrikshald 1802) soon made himself conspicuous. He had began his studies at Stockholm under Fahlcrantz, but went in 1828 to Dresden to receive instruction from Dahl, and afterwards to Munich, where he soon gained a famous name among the contemporary landscape painters. Fearnley depicts, like Dahl, the natural scenery of his native country in its serious and more imposing character. His constant residence in Norway not only exercised the most enduring influence on the direction of his own art, but was also of importance for the growing interest in the art of his native country. He took the initiative in the foundation of the Norwegian national gallery, by bringing a proposal to that affect before the Storthing through an influencial member, the councillor of state Riddervold. The Norwegian national gallery possesses two of Fearnley's best landscapes. In 1841 Fearnley returned to Munich, where he died in 1842.

Gørbitz, Johan, (born at Bergen 1782 † 1853) belongs also to the older masters. His studies in portrait painting were made in Germany and France, particularly in Paris, where during his long sojourn, he acquired a name as a painter and as an aquarellist in miniature painting. His subsequent labor as an artist belongs to his home since he settled in 1835 in Christiania. His excellent portraits of many important contemporaries, are of great and permanent interest.

Munch, Jakob, (born 1776 † 1839) had also worked previously in the same line; he painted also historical pictures and landscapes. He painted for King Carl Johan, who patronised him warmly, a large picture of his coronation as King of Norway; which picture is now in the royal palace at Christiania. The other artists who existed during this period, are of subordinate importance*).

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*) In the small collection of older paintings in the royal villa at Ladegaardsøen near Christiania, the painters from that period are

The landscape painter *Joachim Frich* (born 1810 † 1858) belongs to a somewhat later time. After having studied in Copenhagen, Dresden and Munich, and there painted German landscapes, he chose Christiania as his dwelling place, and treated only subjects from his native country. His diligent work became now of importance at a time when the growth of national art was watched with lively interest. In his later years Frich endeavored to avail himself of the resources of the newer school; and he forms thus a transition from the elder period. Among his best works must be reckoned the cyclus of Norwegian views in the royal villa of Oscarshall near Christiania (painted in his later time).

Baade, Knud, was born in 1808; he was a pupil of *Dahl,* but received most of his education at Munich. His moon-light pictures with subjects from the Norwegian coast have gained for him undisputed renown; and he still continues his labor in the same line.

In the meantime circumstances were becoming more favorable for the development of Norwegian art. In 1837 through Fearnley's initiative, the foundation of the Norwegian national gallery was laid, an institution which indeed with modest means promised only modest results, but which, under the circumstances of the times, has had an influence well corresponding to the original intention. At about the same time, the first *Art Union* was established at Christiania, which for more than a generation has been the central point for the awakening Norwegian art-life, and for the collection of the scattered forces, as also it has effectively promoted the propagation of the artistic

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represented; among others *Flintoe*, *H. A. Grosch*, *Vogt*, *Balke*, *Calmeyer* &c. whose works are of scarcely more than historical interest. Estlander in his »de bildande Konsternas historia« mentions as Norwegian artists from this time, educated in Stockholm, the landscape painter *Linaae* and the miniature painter *Deshington*.

sense in wider circles. Immediately afterwards, similar unions were established at Bergen and later at Throndhjem. From 1839, *stipends* for diligent artists began to appear as regular items in the budget of the state expenses. Thus was preparation made for the appearance of the two great artists *Tidemand* (born 1814) and *Gude* (born 1825), whose labors, however different in direction, did yet so wonderfully supplement each other, that their cooperation has brought to view an almost perfect image of the people and nature of their country. The national subjects of art gained under the genial hands of these masters a new and fresh form, in which they again presented themselves new and fresh to the intelligence. This stimulus to, and elevation of the national art, is doubtless also a significant link in the chain of causes by which the culture of the Norwegian nation has been enabled to progress to its present independence, and through which the patriotic elements have acquired and maintained their influential position also in music, language, poetry, historical writing and literature in general. The education of Norwegian artists in foreign academies has not in this respect enfeebled their influence for their native country and moreover this circumstance could not be avoided, so long as the native country itself offered no facility for more advanced studies. Since about 1845 a circle of Norwegian artists formed itself in Düsseldorf around Gude and Tidemand. Since 1850, when the new Scandinavian style had shewn itself at the exhibition in Stockholm with complete success, the younger Swedish and Finnish painters associated themselves in the same circle, which consisted almost exclusively of pupils of the aforesaid two masters.

King Oscar I encouraged with great generosity the art which at his accession to the throne was blossoming forth. The villa of Oscarshall, built at Ladegaardsøen near Christiania in 1847—1851, was embellished with works of art by the best

Norwegian artists then living; and it has thus become a national art-monument of great significance.

The Norwegian art, moving in the track of Gude and Tidemand, has been almost exclusively directed to represent our native country, its natural scenery and popular life; and **landscape paintings**, appeared for a long time in preponderant numbers. Nearly contemporaneously with Gude, came *August Cappelen* (born 1827 † 1852) whose depictions of forest nature, in its wildness and solitude, belong to the most remarkable productions of the Norwegian painter's art. *Joh. Eckersberg* (born 1822 † 1870) acquired in his later life a name by his fjord- and high mountain pictures. His long residence in his native country is also of significance through his influence as a teacher. The school of painting founded by him in Christiania in 1859 for commencing artists received support from the state, and was taken over after his death in the following year by *Morten Müller* (born 1828), who already at the international exhibition in Paris in 1855 had obtained a prize, and who in his numerous larger landscapes depicts chiefly the Norwegian forest nature and mountain tracts in their more serious character. About at the same time we have *E. Bodom* (born 1829) whose landscape subjects are drawn from the tranquil lakes with surrounding forest scenery, and afterwards from the heights and snowy regions. With these are associated the landscape painter *Bagge* (born 1825), *B. Lund*) born 1812), *G. Mordt* (born 1826 † 1856) and subsequently *Niels B. Møller* (born 1829), *Sofus Jacobsen* (born 1833) a distinguished colorist and *Wexelsen* (born 1830). Marine painting was for a time cultivated only by *Bennetter* (born 1822), who by reason of his education in France stands somewhat further from the other circle of painters, and afterwards by the coast painter *Boll* (born 1825). The still-life style found a successful exponent in *Frantz Bøe* (born 1820) who received his artists education principally in Paris, and who has chiefly painted flowers and animals. *Printz* (born 1819 † 1867) painted in the same line; as also did *Siegwald Dahl* (born in Dresden 1827) son of Professor Dahl, and with greater success. *Askevold* is of more national significance in this line. He was trained in Düsseldorf under *Gude* and subsequently at Paris; his combination of landscape- and animal-painting with a view to depict summer-life in the Norwegian mountain pastures, belongs to the best production of the newer Norwegian landscape art.

In the sphere of **Figure-painting** *Knud Bergslien* (born 1827) p. t. Manager of the school of painting in Christiania, and *K. Lorch* (born 1829) treated, as pupils of Tidemand, some sides of the Norwegian peasant- and sailor-life. *Arbo* (born 1831) has cultivated genre-painting in several directions, but has especially the merit of having introduced historical painting from the old saga times into the Norwegian art, by several important works. Architectural painting has been cultivated by *Lerche* (born 1837), who is also a figure-painter and depicts especially the worldly side of convent life; also by *v. Hanno* (born at Lübeck and educated as an architect). Religious painting has been cultivated by *Chr. Brun* (born 1828). Besides the abovenamed *K. Bergslien* and *Arbo*, the ladies *Schreiber* ond *Hansteen* have also worked in the portrait-line.

Of the younger artists who have received their chief education at Düsseldorf, the following have especially made themselves conspicuous; the genre-painter *Carl Hansen* (born at Stavanger 1841) pupil of Vautier, who represents characters and scenes from the Norwegian popular life, as well from the humoristic, as from the serious side, and *Ludvig Munthe* (born in the province of Bergen 1841) whose winter and autumn landscapes, remarkable for the fine and thorough characterisation of simple subjects, have in the last years attracted considerable attention and obtained prizes of the highest class. Of the land-cape painters contemporary with these artists, we may name *Schancke*, *Amaldus Nielsen*, *Barlag*, *Thurmann*, *Johan Nielssen*, *Rasmussen*, and of genre-painters *Isaachsen*, *Mrs. Dietrichsen* (born Bonnevie), and others.

The Norwegian painters hitherto named and their contemporaries have generally received their higher education at Düsseldorf after having had their elementary or earlier education at the academy in Copenhagen. After that *Eckersberg* had in 1859 established his school of painting in Christiania, the younger painters have usually commenced their studies with him or with his successors. The landscape painters have then mostly gained their further development at Carlsruhe as pupils of *Gude*, while the figure painters have gone to Munich and partly to Paris. Of the youngest artists we may mention: the genre-painters *Ross* and *Eilif Petersen*, the landscape-painters *Schøyen*, († 1876) *Smith-Hald*, *Otto Sinding*, and *Normann*.

The increasing activity in the domain of art has manifested itself in the diligent participation in the great national exhibitions, wherein the Norwegian works have, notwithstanding unfavorable circumstances, obtained a very gratifying appreciation. In most of the larger Norwegian towns, there have been established *Art Unions* with permanent exhibitions and galleries and with not unimportant annual lotteries. Thus besides the 3 elder associations in Christiania, Bergen and Throndhjem, we have also those in Christiansand, Drammen, Arendal, Stavanger, Frederikshald, Tønsberg and in several other places. Moreover there has existed since 1859 the before mentioned school of painting in Christiania, supported by the state and now under the management of K. Bergslien; and finally there has been recently left a considerable private legacy whereby the distribution of public stipends to artists has been greatly increased. The Christiania Savings Bank has given 130,000 Kroner for the establishment of a museum of sculpture in Christiania, for which the state has given the ground. The government is at present occupied with preliminaries for the establishment of an Art academy in Christiania; an institution which is expected to be of great importance for the development of the national art.

Sculpture has hitherto not been able to keep pace with the rapid development of the painter's art, although there has been no want of significant points of attachment. Already in the middle ages, wood-carving was abundantly developed, as many relics of northern wood-carving art testify. Several specimens of this most ancient wood-carving of the North, interesting by their rich style, were exhibited in Paris in 1867. Also in the present time, this accomplishment is assiduously cultivated in the Norwegian mountain districts, where moreover nearly all the Norwegian sculptors have had their home, for instance: *H. Hansen* († 1858), *O. Glosimodt*, *O. Fladager*, *Budal*, *Jacobsen*. They have received their higher education from the eminent Danish sculptors, and afterwards completed their studies at Rome. Most of their not very numerous works are in the genre-sculpture or portrait line, sometimes also representing subjects from the old Norse saga-time. Both the important artists *Middelthun* and *K. Borch* stand outside of this circle: the first distinguishing himself especially by portrait busts, while the latter has preferably executed works in the national spirit. Finally *B. Bergslien* (born 1830) educated in Copenhagen and in Rome, has lately executed the most important sculpture of its kind in Norway, namely the colossal equestrian statue of *King Carl Johan*, which was erected in 1875 in front of the palace at Christiania.

BIOGRAPHICAL NOTICES.

ANKER, J. H. Herman W.

Born 1845 near Christiania, where his Father was a landed proprietor. He has studied landscape painting under *Eckersberg* and subsequently at the academy in Copenhagen, where his first paintings were exhibited in 1872.

ARBO, Peter Nicolai.

Born 1831 at Drammen. After terminating his academical studies at the University of Christiania, he cultivated his artist's talent in Copenhagen and afterwards at Düsseldorf, especially as a pupil of *Professor Sohn*, and under the guidance of the battle-painter *Hünten*. His first works were exhibited in 1857. Subsequently he resided several years in Paris. His most important works are historical pictures, but he has also executed portraits and various kinds of genre-paintings. In 1866 he acted as Norwegian member of the Jury at the great exhibition in *Stockholm*, where the prize was awarded unanimously to his large picture *„the Valkyries“*. The subject of his greatest works are mostly taken from the northern mythological times, and thereby Arbo has gained great merit in the development of historical painting in the patriotic direction. In 1866 he was made knight of the Royal order of Wasa; and in 1873 he was Norwegian commissary at the universal exhibition in Vienna.

Arbo has resided in Christiania since 1871, and is one of the directors of the national gallery.

The best known of Arbo's paintings are: *„A field of battle in the 30 years' war“* 1861; *„the Valkyries“* 1865, in the possession of the royal gallery at Stockholm and of the Norwegian national gallery; *„Ingeborg from the legend of Frithjof“*; *„Episode from the battle of Waterloo“* 1870; *„The battle of Standford bridge“* 1870; *„Aasgaardsrei“* old Norse legend 1871, in the Norwegian national museum.

ASKEVOLD, Anders M.

Born 1834 in the province of Bergen, where his father was a country schoolmaster and member of the Storthing (National assembly). His precocious talents obtained for him the assistance of his countrymen in the prosecution of his studies, which he continued assiduously under the guidance of Professor *Gude* in Düsseldorf. Subsequently he studied a long time in Paris. From 1866 he remained in Bergen and in his natal district in the vicinity. The intention of representing the summer-life in the Norwegian »Sætre« (mountain pastures) by a combination of animals and landscape scenery, is characteristic of the direction of Askevold's art. Inspired by the impressions of his own youth, he has scarcely ever gone beyond the sphere indicated, but has taken all his subjects from the region of his home. His pictures have gained a permanent and constantly increasing esteem. They were at the Copenhagen exhibition of 1872 among the more eminent works of the Norwegian section, and they gained a prize medal at the universal exhibition in Vienna in 1873.

The best known pictures of this artist are: „*Autumn morning in a farm yard*“ 1862; „*Evening at a chalet*“ 1866; „*Evening by the brook*“; in the permanent gallery of the art-union in Christiania. „*Summer morning*“ 1871; „*Mountain pasture life near the Fjord*“ 1872; „*Return from the mountain pasture*“ 1873.

BAADE, Knud,

born in 1808 in the district of Stavanger, where his father was a public functionary. He received his first artistic education in Copenhagen, where he devoted himself to figure painting in the historical direction, but subsequently went over to landscape painting, and was for a time *professor Dahl's* pupil. In the year 1848 he settled in Munich, where already in the following year his moon-light pictures had great success; and his later works have only confirmed this judgment. The artist's peculiar talent has developed itself advantageously in the subjects taken from the wild Norwegian coast. In 1861 he gained at a large exhibition in *Gent* the first class medal, and in the same year his bust was by order of King Ludvig placed in the collection of artists in the Munich Pinakothek.

Of the larger moon-light pictures by Baade belonging to Galleries, the following may be mentioned:

„*Man on the sea-shore*“ 1849, Gallery of Prince Luitpold of Bavaria; „*From the Norwegian mythological time*“ 1851, Munich Pinakothek: „*Moon-light on the Norwegian coast*“ 4851, royal Gallery in Stockholm: „*Stormy night on the Norwegian coast*“ 1869, Gallery of the Grand Duke of Oldenburg: „*Norwegian moon-light scene*“, Town gallery in Bergen: „*Wreck on the Norwegian coast*“, in the Norwegian national museum.

BENNETTER, Johan Jacob,

born in Christiania 1828. He passed 15 years of his youth on the sea, but profited by every opportunity to cultivate his artist's talent. He was thus by his mode of life led involuntarily to Marine painting, which he studied under the guidance of *Louis Meyer* at the Hague and *Th. Gudin* at Paris. Subsequently he has resided mostly in Paris, where he has on several occasions obtained prizes. Most of his numerous pictures represent the open sea-port scenery, frequently after Dutch or French subjects. Bennetter was honored by his King with the medal pro litteris et artibus.

The following are among his best known pictures:

„*Naval engagement off the coast of Madagascar*“, Norwegian national museum; „*Episode of a hurricane in Calcutta*“; „*Moon-lit sea*“; „*Rescue of a ship's crew from the sinking wreck*“ Stockholm exhibition 1866.

BERGH, Anton Mathias,

born 1828 near Drammen. His father was a customs' officer. He became an officer in the Norwegian infantry in 1849 and is at present Captain. He began in 1850 to cultivate the painter's art. He soon gave it up, in order to work as an engineer; but since 1866 he has resumed his artist's studies, and exhibits pictures mostly from the Norwegian high mountains.

BØE, Frantz,

born at Bergen 1820. At first he had to depend on trade-painting for a livelihood. He began his artist's studies at the Copenhagen Academy, and afterwards continued them at Paris, under the instruction of *professor Grønland* and of the French painter *St. Jean.* In the later time he has resided at Bergen. His particular line has always been in the representation of inanimate nature. In his early career he selected for his pictures of still life, rather unpretending subjects; but after his stay in Paris his works acquired a richer and more diversified character. As well by their composition as by the technical treatment of the colors, his paintings since about 1850 obtained a great and rapid success, and regularly found their way into the larger galleries. Bøe made afterwards for several successive years a series of study-tours in Nordland. His representations of animal life in the arctic regions and in the light of the midnight sun, form a peculiar class among his productions. In 1855 he was Scandinavian Juryman at the Paris exhibition; in 1866 he gained a prize at the exhibition in Stockholm, and at the universal exhibition in Vienna in 1873, a prize medal.

The following are among Bøe's best pictures: „*Grapes*" 1850, Luxembourg Gallery Paris; „*Grapes in the sun*" 1853; „*Pheasant and partridges*" 1858, both in the Norwegian national museum; „*A bird rock in Lofoten, midnight sun*" 1860, M. Morrison's gallery London; „*A lady's boudoir*" 1864, permanent Gallery of the art union Christiania; „*Flowers*" 1865, town gallery Bergen.

DAHL, Hans,

born 1849 in Bergen, where his father is Captain in the army. He went through the royal military school, and became officer in 1871. Subsequently he has devoted himself to painting, and has studied figure-painting at Düsseldorf as a pupil of *Gebhardt.* He is now beginning his career as an artist.

DISEN, Andreas E.,

born in 1844 at Modum near Drammen, where his father is a land-owner. He had at first intended to become a trader, but soon received a royal stipend, with which assistance he went over to the painting-school of the landscape painter *J. Eckersberg* in Christiania. Subsequently he was a pupil of *professor Gude* and is at present his assistant in the elementary instruction. The majority of his landscapes represent scenery from the Norwegian heights.

Of Disen's works we may mention „*Norwegian Mountain Scenery*“ Copenhagen exhibition 1872.

GRIMELUND, Johannes Martin,

born in 1842. His father is the present bishop of the province of Throndhjem. He went through a learned school, became student in 1860 and candidate of theology in 1866, after which time he had a position as teacher. He has since given up this position in order to devote himself to painting, and has studied in Carlsruhe under the instruction of *profesor Gude.* Those of his landscapes which have appeared after 1872, represent Norwegian forest and coast scenery.

GUDE, Hans,

born 1825 at Christiania, where his father was a public functionary. He went through a learned school, but after having received at home from *Flintoe* an elementary education in drawing, he came while yet a youth to the painting academy in Düsseldorf, where *A Achenbach* and *professor Schirmer* were his chief teachers. In 1843 he made his first study-tour in Norway; and he then painted in 1844 his first „*high-mountain picture*“ for the art union in Christiania. There soon followed a series of other landscapes from the Norwegian Fjord and mountain regions. These first fruits of Gude's talent were received with enthusiasm, and had a powerful effect in awakening interest for art in his native country, shewing that a new career was opened for the Norwegian landscape painting. His later pictures, among which there are some larger compositions executed in collaboration with *Tidemand*, contributed still more to promote and to develop the fresh life which was at that period stirring in the art-sphere of his home, and wherein his great contemporary *Tidemand* shared the merit. As a matter of course this influence, forming an epoch in the history of our art, gave the signal for the appearance of a host of younger powers, especially in the domain of landscape painting, who nearly all went through his school.

His influence extended also to Sweden and Finland, whence the younger artists since 1850 joined the Norwegian circle in Düsseldorf.

In the year 1852 he gained the great prize medal at Berlin; in 1854 he became professor at the academy of Düsseldorf, and in 1856 King Oscar I., who always rendered to the artist the tribute of benevolent appreciation, honored him by conferring on him the order of St. Olaf »for meritorious service in the sphere of art.« Gude's reputation was at the same time also in Germany constantly in the ascendant; he was considered as one of the most eminent landscape painters of his time; he received marks of honor and offers of preferment. After the death of the celebrated landscape painter *Schirmer*, he took the latter's place in the academy of Carlsruhe. At the great exhibition in Stockholm in 1866, Gude and Tidemand stood at the head of the list of Scandinavian and Finlandish artists to whom distinctions were awarded; and at the universal exhibition in Paris in the year 1867 Gude, maintained likewise the first rank among the northern painters.

Gude's earlier paintings were, as has been mentioned, taken from the Norwegian heights, and he has the peculiar merit of having introduced this new and effective element into the sphere of art. For some time afterwards he painted chiefly the narrow fjords of the province of Bergen and the valleys of southern Norway. In the following years he treated the Norwegian coasts mostly with greater diversification of subjects. A peculiarity in his artist-character is his desire to try his powers, after thorough study, in new fields; this he does with unvarying geniality and never failing success. Gude is of course abundantly represented in most Norwegian and English art galleries, as also in Germany.

Of his paintings we will here mention only some of the best known:

„*High mountain scenery*“ 1847, belongs to Baron Hoff-Rosenkrone in Hardanger. „*4 scenes from the Sognefjord*“ 1850, Oscarshall near Christiania. „*Vossestrand*“ (prize in Berlin 1852). „*Mountain scenery from Ler-*

dal" (prize at the universal exhibition in Paris 1855). »*Birch forest.*« »*Norwegian heights*« both belonging to the Norwegian national museum. »*View over Voss*« (prize) gallery of the Tuilleries. Another «*View over Voss*« 1866 (grand medal) belonging to the Emperor of Germany. »*Fisher hut at sunset*« 1861. »*Evening calm on the coast*» 1862, his greatest picture, London exhibition (2 medals). »*Norwegian mountain Sæter-path*,« belonging to the Princess of Baden. »*Funeral on the Sognefjord*« 1856. Museum in Gottenburg. »*Whalers' return*« 1869. Marriage present to the Crown Princess of Denmark. »*Port of refuge on the Norwegian coast*,« (prize at the universal exhibition in Vienna 1873).

HANNO, Andreas Friedr. Wilh. von

born 1826 in Hamburg of German parents. While at home he qualified himself as an architect, and came in 1850 in this capacity to Christiania, where he has erected several large public buildings. At the same time he has cultivated architectural painting, especially in *Springer's* line; his paintings, which mostly represent buildings of the middle ages and streets of old towns, appear regularly at the exhibitions of the art-unions.

JACOBSEN, Sofus,

born in 1833 in Christiania, where his father is a functionary in the customs. His artistic studies, for which he received in 1855 a public stipend, were commenced in Düsseldorf under the instruction of *Gude*. Jacobsen resided during many years in Germany, where his paintings, chiefly moon light or winter scenery, are in great demand; but his pictures, most of which especially the earlier ones, represent landscapes in the south of Norway, are also well known in his own country. He has attained an advanced position specially as a colorist, and he received a prize medal at the universal exhibition in Vienna.

Jacobsen in represented in the Norwegian national gallery by a »*Forest landscape.*«

LERCHE, Vincent Stoltenberg,

born 1837 at Tønsberg, where his father is a shipowner. In the year 1855 he became a student at the university of Christiania, but went however already in 1856 to Düsseldorf, where he first attended the painting academy and afterwards prosecuted his studies, with remarkable advantage for his development, under the special guidance of Gude. From the first, he devoted himself to architectural painting, and received in 1863, after that his pictures had already found favor, a public stipend for study tours in Germany and Italy. As an architectural painter, Lerche treated with predilection the interiors of middle-age churches and convents; and the accessory groupings form an essential element in his pictures. Among the most esteemed works of this artist, are his representations of convent life from the humoristic side. These pictures border on genre-painting.

Many of Lerche's works are aquarelles.

»*The interior of Lambertskirche in Düsseldorf*« 1862, property of the town gallery in Bergen. »*Interior of St. Marco* in Venice« Stockholm exhibition 1866 and Paris exhibition 1867. »*A convent library* 1872. Royal gallery in Stockholm. »*Unfehlbare Bowle* a convent-scene« property of the permanent gallery of the art-union in Christiania. »*Tithe-day in a convent*« property of the Norwegian national gallery.

LORCK, Karl J.,

born 1829 at Throndhjem, where his father was a merchant. He was at first destined for the army, but left the military school in order to qualify himself as artist at Düsseldorf. He was there a pupil of *Carl Sohn*, and from 1854, of *Tidemand*; and as a genre-painter, he has in some respect taken the direction of the latter, especially in depicting the Norwegian peasant life. He paints also frequently scenes of life on board ship and from the fishermen's life on the coast. He resides in Düsseldorf, and frequently revisits his native country.

Of Lorck's pictures we may mention: »*The Jew pedler on board*, property of the Norwegian national gallery; »*Peasant politicians*,« belonging to King Karl XV's gallery in Stockholm. »*Elk hunters*,« Copenhagen 1872.

MØLLER, Niels Bjørnsen,

born 1827 near Drammen. For several years he worked as an apprentice in the profession, but pursued at the same time his artistic studies, and received from 1852 further instruction, first at the academy in Copenhagen, and subsequently at Düsseldorf. His line is landscape painting; and his pictures usually represent scenes from the Norwegian or German mountain regions. In later years he has resided mostly at Düsseldorf. At the universal exhibition in Vienna, his large *coast scene* from the Swedish skerries attracted attention and obtained for him a prize medal.

At the exhibition at Stockholm in 1866, he contributed 3 »*Norwegian landscapes*;« at the Paris exhibition in 1867, 1 »*German landscape*,» and at the Copenhagen exhibition in 1872, 2 »*Norwegian Fjord landscapes*«. His »*Evening at Lysekil*« is the property of the Swedish national museum.

NICOLAYSEN, Lyder Wenzel,

born 1821 at Bergen, was for many years engaged in business. He prosecuted his artistic studies first as amateur but he was in later years a pupil of *Morten Müller*; and has developed his talents by travelling abroad. His landscapes have appeared subsequently to 1871.

NIELSEN, Amaldus Cl.,

born 1838 in Mandal, where his father was captain of a vessel. He was at first destined to be a working painter; but he soon began to cultivate his artistic talent, first in Copenhagen, and then, with assistance of a public stipend, as landscape painter at Düsseldorf and Carlsruhe. Even in the earliest part of his career he strove to progress in his own style by the diligent study of nature. His subjects are most frequently taken from the south and west coast of Norway, especially from the regions of his home. He is fond of representing shore scenery, with a view of the tranquil sea in the more impressive moments of the evening or morning. His works bear the stamp of the course of study above noticed, which in many respects has not been unfavorable for his development.

Of his landscapes we may mention:

»*Evening on the Norwegian coast*,« Stockholm exhibition 1866. »*View of the town of Mandal*,« 1867. »*Skogsfjord near Mandal. Summer evening.*«

»*Landscape on the Hardangerfjord*,« Copenhagen exhibition 1872.

NIELSSEN, Johan,

born 1836 at Christiansand, where his father was a merchant. After having devoted himself during several years to agricultural pursuits, he began in 1863, after some preparation at home, to study painting in the academy at Düsseldorf. He went thence in 1865 with a public stipend to Carlsruhe to profit by the instruction of *Gude*, which has had the greatest influence on his development. Johan Nielssen's landscapes are mostly taken from the northern Norwegian coast; but he has also produced representations of the interior of the country and of the heights. He selects preferably natural scenery of a serious character.

Of his pictures we mention:

»*Norwegian heights from Sætersdal*,« Stockholm exhibition 1866. »*Norwegian coast*,« in the gallery of the German Emperior. »*Norwegian Fisher-huts*,» Munich exhibition 1869. »*Scene from the coast in Lofoten*,« Copenhagen exhibition 1872.

NORMANN, Eilert Adelsten,

born 1848 in Bodø in Nordland. After various preparatory studies — partly in figure painting — he qualified himself as a landscape painter in the academy at Düssseldorf. His larger pictures represent the interior Norwegian fjords with their rocky surroundings and have lately attracted attention.

At the Copenhagen exhibition his early talent was represented in a »*Norwegian landscape.*«

RUMMELHOFF, Chr.,

born at Arendal, where his father was a ship owner. He has applied himself to landscape-painting at Düsseldorf and received some instruction from *Morten Müller*. His first pictures appeared in the Christiania art union in 1869.

SCHANCHE, Herman G.,

born in Bergen. He studied in Düsseldorf, and was for a long time the pupil of Gude. His pictures usually represent landscapes of the Bergen Fjord district; and they were admired at the Vienna universal exhibition, where he obtained the prize medal.

He exhibited his „*Entrance into the town of Bergen by moonlight*“, at Copenhagen in 1872, and „*Fjord in Sogn*“, at the Vienna exhibition in 1873.

SCHIVE, Jacob,

born 1846 in the province of Throndhjem, where his father was sheriff. He studied landscape-painting first at Christiania as a pupil of *Eckersberg* and *Morten Müller*, afterwards at Düsseldorf. He exhibited a „*Winter scene from Hardanger*“ at Copenhagen in 1872.

SINDING, Otto,

born 1842 at Kongsberg, where his father was a mining-master. After having received his preparatory academical education and completed his study of the law at the university of Christiania, he received an appointment in one of the government departments. From 1867 he began to qualify himself for landscape-painting first under *Joh. Eckersberg's* guidance, and afterwards as a pupil of professor *Gude* at Carlsruhe. He made rapid progress, and exhibited already in 1869 very promising works. In all his landscapes, varied as are the subjects, there appears an unmistakable endeavor to depict the natural scenery of his home in its more earnest character. He afterwards studied in Munich and extended his sphere of labor in many new lines of landscape-painting and partly in that of figure-painting. At the Copenhagen exhibition, he was represented by the two pictures „*Pine forest*“ and „*Hide*“, children hiding themselves in the ferns. He has also painted „*Evening twilight*“, art union in Christiania 1872. „*Fight at a peasant's wedding*“. „*Autumn gale on the west coast of Norway*“ 1876.

SKARI, Edward O. R.,

born 1837 at Christiania. After a merely elementary course in the school of art in Christiania, he began almost without assistance to apply himself first to landscape-painting and then more particularly to marine-painting; only at a later period he received instruction from the marine-painter *C. F. Sørensen* in Copenhagen, and a stipend. His subjects are furnished by the sea on the Norwegian coast. He exhibited at Copenhagen and Vienna.

SMITH-HALD, Frithjof,

born 1846 in Christiania, where his father was a legal functionary. He began his studies in *Joh. Eckersberg's* painting school in Christiania, and was afterwards professor *Gude's* pupil. In his diversified selection of subjects, the natural scenery of his home is usually represented, especially the forest regions in their more cheerful character. Afterwards he frequently chose coast scenery in the evening light or moonlight. He painted for the Copenhagen exhibition a „*landscape from Bæverthal*", and for the Vienna exhibition 1873, „*An autumn landscape.*

THAULOW, Fritz,

born 1847 in Christiania, where his father owns a dispensary. After having received his academical and pharmaceutical education at the university of Christiania, he devoted himself to art in Copenhagen, and studied marine-painting under the guidance of professor *Sørensen* and subsequently as a pupil of *Gude.* His pictures represent the coast and the open sea, and have appeared since 1873.

THURMANN, Peder Cappelen,

born 1839 at Frederikshald. His father is a preacher. He studied landscape-painting, first at Düsseldorf as *Gude's* pupil, and then at Munich. In the years 1858—60 he exhibited his first pictures. These represent usually scenes of home, most frequently in the morning or evening light; but he has also taken from his study-tours in Germany and upper Italy the subjects of several landscapes. He was for a time teacher in the school of painting in Christiania. Of his works we may mention: „*Landscape*", Stockholm exhibition 1866; „*From Hardangerfjord*", Copenhagen exhibition 1872; „*Spearing*

Fish", torch-light and moon-light, 1861; „*2 Italian landscapes*", 1874.

TIDEMAND, Adolf,

born 1814 in the town of Mandal, in southern Norway, where his father was a custom house officer. In the year 1832 he went to the academy of art in Copenhagen, where he continued his studies till 1837, in which year he went to Düsseldorf to avail himself of the instruction of *Hildebrandt* and *W. Schadow*. In 1841 he went with introductions from *Kaulbach* to Munich, and then studied the old masters in Italy. Up to this period his sphere of predilection had been historical painting; but during his stay in his native country, in the year 1845, he acquired a decided turn for genre painting; and henceforth he selected Norwegian popular life as the subject of his pictures, which he executed in dimensions approaching those of historical painting. Most of these scenes from popular life bear a mild idyllic or elegiac character. Some of the artist's more important works, such as his „*Duel in the old north*" and „*The Fanatics*" bear however witness, by their forcible epic demonstrations, to his talent also in that line in which it was first cultivated. His earliest works in the sphere of genre exited unusual attention, by the intelligent conception of the types of popular character and the charm of the depiction. He established his fame by his great work, „*The Haugians*" (a Norwegian religious sect) in 1848, which went into the Düsseldorf gallery and (repainted) into the Norwegian national gallery. This picture obtained for him the gold medal of the Berlin Academy. Henceforth Tidemand chose Düsseldorf as the place of his residence; but he regularly made study-tours to his native country. From his studies in Düsseldorf, there now appeared in rapid succession those numerous and important works which were like luminous points in the exhibitions at home, as well as in the great international competitions. Tidemand's long and distinguished career has been of importance for his country, not only by his having given a fresh stimulus to art and having directed it in new lines, but also in wider spheres he has exercised a powerful influence by awakening and invigorating the national spirit in poetry and literature. From this point of view his efforts have been essentially supported by his friend the landscape painter *Gude*, in collaboration with whom he has executed several great compositions which belong to the most important creations of northern art. Tidemand has been honored with all the distinctions which it is possible for an eminent artist to enjoy. Already in 1856 he received from King Oscar I the order of St. Olaf, after having previously executed the great cyclus of his pictures „*From the Norwegian peasant life*“ for the royal villa Oscarshall near Christiania. In Stockholm his name stood in 1866 at the great Scandinavian exhibition, by the side of Gude's, at the head of the list. At the celebration of the 50th anniversary of the establishment of the Düsseldorf Academy, he was appointed as royal professor.

Among the number of his most excellent pictures, the following may here be mentioned:

„*Return from the bear hunt*“, ordered by Oscar I. „*Parting*“, property of Mr. Th. Meyer, Christiania. „*Sad News*“, Town Gallery of Bergen. „*Woman in the Mora-church*“, in Vienna. „*The fanatics*“, Gottenburg. „*Duel in the old north*“, his largest picture, Paris exhibition 1867. „*The lonely old ones*“; property of the Norwegian national museum. „*The grandmother's bridal crown*“, bridal gift from the ladies of Christiania to the Crown Princess of Denmark. In collaboration with Gude: „*Wedding procession on the Hardangerfjord*“, „*Fishing boat on the lake*“, „*Funeral on the Sognefjord*“.

(Tidemand is noticed here, although it is uncertain whether he can be represented at the Philad. Exhibition).

ULFSTEN, Nicolai Nielsen,

born at Bergen. He is a commencing artist, and has studied landscape, painting at Carlsruhe as pupil of *professor Gude*, who has recommended him to be admitted as a contributor to the Philadelphia exhibition.

WEXELSEN, Christian D.,

born 1835 in the parish of Thoten. After some preparatory study he came in 1852 to Düsseldorf, where *Gude* instructed him and obtained for him a stipend. Subsequently he has appeared chiefly as a landscape-painter in Christiania. His pictures generally represent the more cheerful verdant scenery of the Norwegian mountain valleys, especially in the southern part of the country. He is represented in the Norwegian national museum.

Of his landscapes we may mention:

„*Pasture-hut in Gudbrandsdal*“ and „*Landscape from Gudbrandsdal*“ Stockholm exhibition 1866; „*Morning scene*“, property of the town Gallery in Drammen; „*Scene from Næsodden*“, property of the Norwegian national museum; „*Hardangerfjord*“ 1876.

BORCH, Kristoffer,

born 1817 in Drammen where his father was a merchant. He applied himself at an early age to figure-carving and ornamentation, and did not until 30 years old decide on devoting himself to sculpture. He began his studies in this art at the Copenhagen Academy under the guidance of professor *Bissen.* His earliest works promised well; and he soon received from King Oscar I orders for the villa Oscarshall (built in 1852) which did him honor. He subsequently continued his studies in Rome partly with assistance of a public stipend. In the year 1860 he became a teacher in the royal school of art in Christiania. Borch has executed a considerable number of plastic works in various directions, especially reliefs and statues from biblical and mythological history, genre sculpture and also portrait-busts. His studies of predilection have been directed to illustrate Norwegian national peculiarity. In this respect particular mention should be made of his cyclus of figures completed in 1869, wherein he represents the 4 seasons according to subjects taken from home life.

Of his other works we may mention: „*Christ*“, a collossal statue; „*A northern bard*“, belonging to the Norwegian national museum; „*David*“ statue, property of Mr. Rothschild London. „*Jeptha's daughter*“ 1875.

SINDING, Stephan Abel,

born at Throndhjem 1846. He became a student in 1865 and afterwards began to apply himself to Art; first in Christiania under the guidance of the Sculptor *Middelthun*, then in the atelier of professor *Alb. Wolff* in Berlin and subsequently at Paris. He has already executed several works, chiefly on subjects from the northern mythology.

SCULPTURE.

CLASS 400,

142. BORCH, Chr., Rome.

1. Jepthas Daughter. (Judges XI. 31). Statue of marble, natural size, Price £ 425.
2. »Morning« and »Evening.« 2 statues of marble, half natural size, with pedestal. Price for the pair £ 450.
3. »Sulamith«, from the Song of Salomon, statue of plaster, natural size. Price £ 50, for execution in marble £ 325.

143. SINDING, Stephan, Christiania.

1. Hermes, statue of marble, natural size. Price 1000 Dollars.
2. Vølund, statue of plaster, natural size. Price 500 Dollars.

PAINTING.

CLASS 401.

144. ANKER, Herm., Christiania.

1. Scenery in Romsdalen. Priee 100 Dollars.
2. Scenery near Loen in Nordfjord. Prize 100 Dollars.

145. ARBO, P. N., Christiania.

»Day.« Price 2000 Dollars.

146. ASKEVOLD, A., Bergen.

1. Summer day at the mountain-tarn. Price 1200 Dollars.
2. Evening on the mountain-pastures (châlet). Price 900 Dollars.

147. BENNETTER, J. J., Paris.

1. Vikings at sea: Moon-light and storm.
   Price 1000 Dollars.
2. Sea-fight between the frigate »la Preneuse« and the line- of battle-ship »Jupiter« on the heights of Le Banc des Aiguilles 26 Septbr. 1799.
   Price 600 Dollars.

148. BERGH, Anton, Christiania.

Folgefonden, glacier in Hardanger. Price 150 Dollars.

149. BAADE, Knud, Munich.

Subject from the Norwegian coast. Price 400 Dollars.

150. BØE, Frants, Bergen.

1. Flowers. Price 700 Dollars.
2. Fruits. Price 600 Dollars.
3. Midnight sunlight in Norway. Price 600 Dollars.

151. DAHL, Hans, Bergen.

Figure-painting, subject from the western Norway.
Price 500 Dollars.

152. DISEN, And., Carlsruhe.

Mountain-scenery.

153. GRIMELUND, J. M., Paris.

A summer-morning in the birch-forest.
Price 200 Dollars.

154. GUDE, Hans, Professor, Carlsruhe.

1. A fresh breeze. Norwegian coast.
   Price 5000 Dollars.
2. Calm. Christianiafiord. Price 2500 Dollars.
3. View from Drøbak, near Christiania.
   Price 2000 Dollars.

155. von HANNO, W., Christiania.

Subject from Braunschweig. Price 150 Dollars.

156. JACOBSEN, S., Düsseldorf.

1. Winter-scenery. Price 1000 Dollars.
2. Autumn-scenery. Price 1000 Dollars.

157. **LERCHE**, Vinc. St. Düsseldorf.

1. Studio in a monastery. Price 500 Dollars.
2. Interior do. Price 450 Dollars.

158. **LORCK**, Karl J., Düsseldorf.

The elk-hunters. Price 600 Dollars.

159. **MØLLER**, Niels B., Düsseldorf.

1. The Kirkevig near Lysekil, Sweden. Price 1200 Dollars.
2. Moonshine, Lysekil. Price 300 Dollars.
3. Waterfall in Telemarken, Norway. Price 400 Doll.
4. From Fjærland, Sognefiord, Norway. Price 1000 Dollars.

160. **NICOLAYSEN**, L. W., Christiania.

Norwegian landscape, from the lake Bandak, in Telemarken, Price 500 Dollars.

161. **NIELSSEN**, Johan, München.

1. Approaching tunder-storm, Lofoten islands, Norway. Price 500 Dollars.

162. **NIELSEN**, Amaldus, Christiania.

1. Scenery in the Sognefiord, Norway. Price 1500 Dollars.
2. The Vingeraashei, Thelemarken. Price 1000 Dollars.
3. Towards evening. Price 400 Dollars.

163. **NORMANN**, A., Düsseldorf.

1. Scenery in the Romsdalsfiord. Price 1500 Dollars.
2. Landscape from Lærdal, Sognefiord. Price 750 Dollars.
3. Norwegian Fjord. Price 250 Dollars.

164. **RUMMELHOFF**, Chr, Arendal.

1. Morning. Faleide in Nordfiord. Price 160 Dollars.
2. After rain, subject from the Sørfiord. Price 160 Dollars.

165. **SINDING**, Otto, München.

1. Ruth and Boaz. Price 1000 Dollars.
2. Fight at a Christmas-feast. Price 500 Dollars.

166. SKARI, E. O. R., Christiania.

French fishermen in the channel. Price 450 Dollars.

167. SCHANCHE, HERM. G., Düsseldorf.

«The Folgefond», glacier in Norway. Price 700 Dollars.

168. SCHIVE, JACOB, Düsseldorf.

Norwegian winter-landscape.

169. SMITH-HALD, F., Düsseldorf.

1. Winter-day, Bohuslän, Sweden. Price 500 Dollars.
2. Winter-evening at the swedish coast. Price 500 Dollars.

170. THAULOW, FRITZ, Christiania.

1. Scene from the ice-channel, Christianiafjord. Price 500 Dollars.
2. On the Thames. Price 500 Dollars.
3. Midsummer-night on the Norwegian coast. Price 500 Dollars.

171. THURMAN, P., Christiania.

Hardangerfiord. Price 500 Dollars.

172. ULFSTEN, P., Carlsruhe.

Moon-rise on the Norwegian coast. Price 200 Dollars.

173. WEXELSEN, CHR., Christiania.

Scenery from Sørfiord, Hardanger. Price 800 Dollars.

174. VIGDAL, A. G., Bergen.

Waterfall, subject from Vos. Price 300 Dollars.

CLASS 411.

175. LERCHE, VINC. ST., Düsseldorf.

Illustrations of popular rhymes and nursery tales, 13 aquarelles. Price for the set 300 Dollars.

PHOTOGRAPHY.

CLASS 430.

176. AUBERT, E. E, Christiania.
Photographs on paper.

177. CARSTENS, B., A., Vossevangen.
Photographs on paper.

178. KLEM, FREDERIK, Christiania.
Photograph-portraits.

179. KNUDSEN, CLAUS, Christiania.
Photograph-portraits.

180. KNUDSEN, K., Bergen.
Photographs on paper.

181. PETERSEN, PETER, *chief of the photo-lithographical Department in the Geographical Survey Office,* Christiania.

1. Photographs of antiquities belonging to the University of Christiania.
2. Facsimile of antique Norwegian codices (Kongespeilet« and «Didrik of Berns Saga»).

(see No. 187.)

182. SZACINSKI, L., Christiania.
Photograph-portraits.

Established 1868. Membre de la société française de Photographie à Paris. Was the only Photographer from Norway who at the Vienna international Exhibition 1873 was awarded a medal for Photograph-portraits (Verdienst Medaille).

CLASS 405.

183. BENNET, T., Christiania.
Collection of wood-carvings.

It is only about 20 years ago, that the peasants of Norway found in the art of woodcarving means of real trade; the talents of these mountaineers were then brought before the eye of the general public by the establishment of a depôt in Christiania, for the purchase and sale of their workmanship. About 4 years ago the management of this depôt came into the hands of the present exhibitor (T. Bennett, Christiania), who now affords employment to numerous peasants in the various districts of Norway, and owns the sole collection of woodcarvings in Christiania.

The trade is chiefly kept up by American and English tourists, of which numbers visit Norway every summer, and who, as a souvenir, take home with them some of these specimens of Norwegian skill.

184. KAARSTAD, J. O., Drammen.

Wood-carvings.

Established 1865.

Wood carving chiefly for furniture-ornaments and for ships; also for fancy articles.

Medal in Stockholm 1866.
— - — 1873.

185. LIE, H. O., Christiansand.

Wood-carvings.

The exhibitor is teacher at the communal school of Christiansand and has carved the exhibited articles in his leisure time.

CLASS 454.

186. PETERSEN, Peter, *chief of the photo-lithographical Department in the Geographical Survey Office,* Christiania.

Electrotype copies of ancient Scandinavian Gold-Bracteates.
(see No. 181).

DEPARTMENT V.

MACHINERY.

MOTORS AND APPARATUS FOR THE GENERATION AND TRANSMISSION OF POWER.

CLASS 550.

187. GJERDRUM, Otto, Master of the hounds of H. M. the king of Norway, Christiania.

Model of automatic smoke-consuming apparatus for boilers.

The boiler is bricked up in the following manner:

The fire-place under the bottom of the boiler is divided longitudinally into parts by a partition (of iron or fire-brick) with two large apertures in it, so that the flame can pass from the one side to the other. The heat thus advances first under the boiler and returns, through the tubes and along the sides of the boiler, to the chimney.

Two dampers are placed in front of both fire-ways, which run along the sides of the boiler inclosed in frames and shutting tightly. The axes of the dampers are conducted through the front wall over the fire doors, and are here connected by 2 iron rods, so that when one damper is open the other is closed.

Now when one fire-door is opened for firing, the spring arm fixed on the same shuts the damper belonging to it; and at the same time the other damper is opened. The draft of the chimney draws the particles of coal formed by the firing through the openings in the partition, and forces them to pass through the flames in the other compartment. Through the gratings (if they are cast) or behind them if they are of brick, heated fresh air is introduced into the flame from iron tubes placed close under the grating of the fire-place, so longas the fire-door stands open.

When the fire-door is closed again after the firing, the damper belonging to it is kept closed by the elasticity of the spring, until the other fire-door is opened; and the new smoke produced is forced to go the reverse way through the flames of the first fire-pace.

When intense firing is required, the stoker can, 1 or 2 minutes after the coal is thrown in, turn the damper open by hand.

CLASS 553.

188. KLEM HANSEN & C^o., Trondhjem.

Belting of wallrus hides.

(see No. 240.)

AERIAL, PNEUMATIC, AND WATER TRANSPORTATION.

Living in a country whose soil was poor, and surrounded by the sea, the Norsemen, immediately after their immigration from the south or the east, began to utilise this sea, which abounded in fish of different species. But fishing did not satisfy them long; the riches of the southern countries drew their minds towards these happier regions; the woods, which covered their mountains and hills, offered them the principal materials for attaining the fulfilment of their desires; and at the same time when the history of Norway begins in the eighth century, the annals of Germany, England and France mention the Norse Vikings, as plundering their coasts. In the following century we find them in Ireland, where they founded several states under their chiefs (sea-kings), and in the Mediterranean, and in 870 they discovered and peopled Iceland. From here they went to Greenland; and in the year 1000 Leif Eiriksson and his followers established themselves in Massachusetts, which they called wine-land. But the Norse colonists could not resist the great number of natives, and being moreover at variance they soon returned to Iceland, from whence they seem to have kept up communications with the new world until 40 or 50 years later.

In the middle-ages the mighty Hansa-confederacy ruined the Norwegian navigation, which yet revived in the seventeenth century and later successively developed itself. During the last fifty years it has increased wonderfully, and now the Norwegian merchant navy is among the greatest of Europe, the number of vessels amounting at present to abt. 8,000 of abt. 1,500,000 tons burden and manned with abt. 60,000 seamen, besides a large quantity of small coast-traders. The navigation also is now the most important branch of the Norwegian industry, its gross-produce being estimated at from 25 to 30 millions and its net-produce from 15 to 20 millions of Dollars per annum.

Of the Norwegian fleet the vessels are principally built in the country, and ship-building is consequently a highly important branch of industry, occupying regularly 4 to 5,000 men.

The steam-fleet is still proportionally small, the nnmber of steamers not surpassing 250 of abt. 50,000 tons burden, but regularly developing. It consists principally of iron-steamers constructed in England, with wich country 4 Norwegian iron-ship-building yards have been competing during the last years. Some wooden sailing-vessels are also every year bought from abroad, the Norwegian yards having been unable to satisfy the demand.

In many districts, construction of boats for the fisheries is of some importance. In the boats there is a great variety of forms according to the waters they have to cross and the different kinds of fishery for which they are designed. The visitors of the Exhibition will find a large collection of models of boats in the Norwegian fishery-department.

CLASS 594.

189. ARENTZ, Hjalmar, Christiania.
Models and drawing of iron ships.

190. BRANDI, J., shipbuilder, Christiania.
Drawings and models of sailing vessels.

191. THE FISHERY MUSEUM, Aalesund.
Models of fishing boats.
(see No. 231).

192. GRAN, Jens, shipbuilder, Bergen.
Models of sailing vessels.

193. HANSEN, Carl, A., shipbuilder, Porsgrund.
Models and drawings of sailing vessels.

194. HANSEN, Randoph, Bergen.
Model of Sailing vessel.

195. THE MUSEUM OF BERGEN, Bergen.
Collection of models of fishing boats.
(see No. 140, 215, 216, 223, 224, 232).

DEPARTMENT VI.

AGRICULTURE.

In the economy of Norway the forests are of high importance, their produce being not only sufficient for the consumption of the country, but giving also a large surplus for exportation. Yet many districts, especially in the northern and western part of the country, are obliged to buy great quantities from others and principally from the eastern provinces, in which large tracts are still covered with rich woods.

The first place is taken by the fir and pine (Pinus sylvestris and Pinus abies) of which 60 to 70 millions of cubic-feet, partly in logs, partly sawn and planed, and worth 12 to 14 millions of Dollars have been exported in each of the last years; then come the birch and the alder (Betula and Alnus), principally used for fuel in the Norwegian houses. The oak is more scarce and not sufficient for the ship-building, for which some quantities are imported from the Baltic. The beech (Fagus sylvatica) appears but rarely; the hazel (Corylus avellana) and the willow (Salix caprea) more frequently.

Orchard culture, though giving a valuable surplus in some districts, is but little developed in Norway in general, and large quantities of apples, pears etc. are imported from Denmark, Germany, France and the Netherlands.

But of the highest importance among the articles imported into Norway are the cereals, the quantity drawn from abroad amounting to about 3 millions of hectolitres per annum; while the production of the country is estimated at 100,000 hectolitres wheat, 250,000 hectolitres rye, 1,300,000 hectolitres barley 3,000,000 hectolitres oats, 600,000 hectolitres meslin (barley and oats), 70,000 hectolitres peas and 7 millions hectolitres potatoes, worth abt. 14 millions of Dollars, and the value of the cereals imported, consisting principally of rye and barley, is estimated at abt. 8 millions.

Norway's cattle-stock is estimated at abt. 150,000 horses, 950,000 cows and oxen, 1,700,000 sheep, 260,000 goats, 100,000 pigs and 102,000 rein-deer, producing abt. 25 millions of Dollars pr. annum.

Their produce is far from sufficient for the consumption of the country, the value of its importation of butter and cheese amounting to abt. 600,000 Dollars; of beef and bacon to abt. 500,000 Dollars, of wool to abt. 150,000 Dollars, of hides and furs to nearly 600,000 Dollars; while the exportation of the two latter articles is estimated at 350,000 Dollars per annum.

The produce of the Norwegian Fisheries has nearly the same value as that of the agriculture, as our readers will see from the annexed review of the fisheries; and they are of the highest importance for the inhabitants of the northern part of the country, where neither cereals nor woods will grow, and where the grass is scarce, giving them abundant means to provide the necessaries of life.

With the cold and rough climate and the sterility of a great part of Norway, the necessities of its inhabitants are very great, which may be observed from the following summary of

Importation

in the last years:

Live stock (cattle)	value Dollars	200,000
Produce of animals for food		1,800,000
Cereals		9,000,000
Colonial products		6,000,000
Fruits, vegetables, roots		600,000
Liquors		1,000,000
Textiles		2,000,000
Yarns		1,000,000
Textures		6,000,000
Different products of animals		1,500,000
Oils, tar &c.		1,000,000
Wood: raw, sawn and manufactured		800,000
Colors		400,000
Other vegetables		500,000
Paper		200,000
Minerals and mineral-products		3,00,0000
Raw metals		1,500,000
Manufactured metals		1,500,000
Engines, hardware &c.		1,300,000
Steam- and sailing-vessels		3,000,000
	Doll.	42,300,000

The exports

consist of:

Live stock	100,000
Products of animals for food	9,000,000
Cereals (oats)	300,000
Liquors	250,000
Yarns	200,000
Textures	500,000
Different products of animals	1,600,000
Oils, principally fish-oil	1,700,000

Woods, raw and sawn	14,000,000
Colors	50,000
Other vegetable products	250,000
Paper	100,000
Minerals	1,300,000
Mineral-products	200,000
Raw metals	500,000
Manufactured metals	150,000
Engines and hardware	150,000
Vessels	100,000
	Doll. 30,350,000

ARBORICULTURE AND FOREST PRODUCTS.

CLASS 600.

196. HOLMENS SAWING AND PLANING MILLS,

Drammen.

Grooved and tongued flooring-boards and mouldings.

Established 1874.

The proprietors are several of the largest Timber-firms in Drammen.

The place of business is the Island Holmen with an area of 208,308 □ yards, surrounded on all sides by water; so that vessels of 1000 tons burthen can conveniently lie and load alongside of the warehouse, in which 2500 Petersburg Standards can be stored.

The apparatus of the works consists of 2 steam-planing houses, wherein 4 planing machines and 1 moulding machine with cleaving and cross-cutting saws; 1 steam saw mill wherein 3 vertical saws circular saws and complete stave machinery.

Steam power 120 horse.

Working staff 200.

Yearly production 15,000 Petersburg. Standards of sawn and planed goods.

Chief markets: England, Germany, France, Belgium, Holland and Denmark.

Agents in London Messrs. G. F. Neame & Co. 7, East India Avenue E. C.; in Liverpool Messrs. Farnworth & Jardine, and for Germany, in Bremen, Emden, and Duisburg, Messrs. F. W. Barth & Co.

197. HOLST, Chr., Christiania.

Head Steward to H. M. the King.

Specimens of Norwegian woods (from the Agricultural Museum of the Royal Domain Ladegaardsøen).

(see No. 42, 203, 273).

198. KOLDFOSSEN BOBBIN-WORKS, near Bergen.

Bobbins and condensor props.

199. THAMS & Co., M., Trondhjem.

Trunks, planks, battens, rough and planed.

Staves, cases, lists.

Steam- Saw- and Flooring-mills at their shipping place Strandheim, Orkedalsoren. Manufacturers and exporters of deals, battens, flooring- and match-boards, staves, fish-boxes for the Stockfish export to Havana and Brazils, mouldings, doors, windows &c.

AGRICULTURAL PRODUCTS.

CLASS 620.

200. AAS AGRICULTURAL ACADEMY, Follo pr. Christiania.

Director F. A. Dahl.

Winter-wheat,	grown 1875,	weight pr. barrel	129	Kilo.
Winter-rye	—	—	120	«
Spring-wheat	—	—	134	«
Barley, 2rowed	—	—	119	«
do. 6rowed	—	—	117	«
Oats	—	—	99	«
Corn (Barley & oats)	—	—	102	«

(see No. 212)

The Aas agricultural academy is situated on 59° 40′ n. lat. and 28° 25′ longitude east of Ferro.

First medals at all former international exhibitions.

201. DOMAAS, Christopher, Gjermundsnæs, Romsdal.

Oats.

Grown 1875 on the farm Gjermundsnæs belonging to the exhibitor, situated on 62° 37′ n. lat. and 24° 58′ long. east of Ferro, close by the Romsdalsfjord. All the oats in Romsdalen generally is like the sample exhibited.

202. HOFF-ROSENKRONE, Baron G., Rosendal pr. Bergen.

Oats.

Grown on the property Rosendal in Hardanger, situated between the glacier Folgefonden and the Hardangerfiord on 60° n. lat.

203. HOLST, Chr., Christiania.

Head Steward to H. M. the King.

Corn in airns (10 glasses) } from the Royal Domain
Corn and seeds (9 glasses) }
Ladegaardsøen, near *Christiania.* (59° 50′ n. lat.)
(See No. 42, 197, 273).

204. KRISTIANS AMTS AGRICULTURAL SCHOOL pr. Gjøvig.

Director Th. Kollter.

No. 1. Secale cereale. Winter-rye.
« 2. Hordeum vulgare. Common 6 rowed barley.
« 3. Hordeum hexastichon. Star-barley, — 6 rowed barley.
« 4. Hordeum Zeocriton. Fan-barley, — 2 rowed barley.
« 5. Pisum arvense. Grey peas, early ripe.
(see No. 213).

The agricultural-school-farm Houg, where the exhibited articles are grown, is situated 7 eng. miles from the western border of the lake Mjøsen on 61° n. lat. and about 1450 feet above the surface of the sea.

205. SCHIRØD, Chr., Aker pr. Christiania.

Wheat, rye, corn and barley.

Grown 1875 on the farm of the exhibitor in Aker near Christiania on 59° 50′ n. lat.

206. STEND AGRICULTURAL SCHOOL, near Bergen.

Samples of barley, and oats.
(See No. 209 & 235).

Situated on the west coast of Norway between 60 and 61° n. lat,

207. SVANØE, Chr., Nordre Bergenhus Amt.

Four samples of corn.

Grown last year on the farm of the exhibitor, situated on the west coast of Norway, on 61° 25′ n. lat.

208. SVERDRUP, Riis in Follo pr. Christiania.

1.	Winter rye,	grown 1875.	Weight per barrel	131 Kilo
2.	Spring wheat	—	—	131 «
3.	Barley, 6rowed	—	—	115 s
4.	Oats	—	—	90 «

The property Riis is situated on 59° 40′ n. lat. in the same diocese as the Aas agricultural Academy.

CLASS 622.

209. STEND AGRICULTURAL SCHOOL,

near Bergen.

Samples of potatoes.

(See No. 207 & 235.)

CLASS 623.

210. LANGAARD, Conrad, Christiania.

Cigars, smoking and chewing tobacco.

Established 1850.

Quantity of raw Tobacco employed in 1870 — 151,000 Pound leaf,
in 1875 — 380,000 — —

Value of Tobacco manufactured in 1875 Sp. 150,000.

A 4 horse-power steam engine with 8 horse boiler.

Working staff about 160.

Market, the whole of Norway and a small part of Sweden.

Bronze Medal in Copenhagen 1872.
Medal of merit in Vienna 1873.
Honorable notice in Drammen 1873.

211. WITH, Johs. N., Christiania.

Cigars, smoking and chewing tobacco.

The manufactory which was established in the autumn 1852 and then only comprised chewing tobacco in the form of rolls and pressed leaf tobacco, commenced with about 15 workmen.

As this branch of manufacture was gradually extended, the manufacture of smoking tobacco was taken up in 1865 so that the manufactory at present occupies about 115 workmen, and the production has grown to about 315,000 Pund chewing tobacco and about 25,000 smoking tobacco

The work is carried on in a 4 story building in the centre of the town, and the machinery consists of

4 hydraulic presses
1 cutting machine,
1 rolling machine,
5 spinning machines of the newest construction which are worked by a steam engine, and 36 wooden presses.

The sale is chiefly confined to Norway, extending over the whole country, and partly to Sweden.

If a complete Drawbacksystem, wich at present only exists in a limited form. can be introduced, an export trade can also be carried on.

CLASS 624.

212. AAS AGRICULTURAL ACADEMY, Follo pr. Christiania.

Gras-seed-mixture as used for the meadows of Aas, grown 1875. (No. 8).

Seeds of timothy, grown 1874 (No 9).

(See No. 200).

213. KRISTIANS AMTS AGRICULTURAL SCHOOL, pr. Gjøvig.

Trifolium pratense. Red clover. (No. 6).

(See No. 204).

This is a peculiar variety of greater endurance and stronger growth, and which lives for more years and blooms a little later than the common red clover. It has been cultivated in that neighbourhood for upwards of 30 years.

LAND ANIMALS.

CLASS 635.

214. E. KNUDSEN & ISAKSEN, Bergen.

Stuffed birds.

MARINE ANIMALS, FISH CULTURE AND APPARATUS.

CLASS 640.

215. THE MUSEUM OF BERGEN.

Delphinapterus leucas, Tallas, in alcohol. 1 Ex.

Delphinus aactus, J. E. Gray, stuffed. 1 Ex.

CLASS 641.

216. THE MUSEUM OF BERGEN.

Fishes in alcohol:

Gasterasteus aculentus, Lin. 2 Ex.

Spinacleia vulgaris, Fleming. 1 Ex.

Sparus centrodontus, Cuv. 2 Ex.
Sebastes Norwegicus, Cuv. 1 Ex.
do. 1 Ex.
S. imperialis, Cuv. 1 Ex.
Cottus scorpius, Fabr. 2 Ex.
C. bubalis, Euphr. 1 Ex.
Phobetor ventralis, Cuv. & Val. 1 Ex.
Trigla gurnardus, Lin. 2 Ex.
Agonus cataphractus, Lin. 2 Ex.
Trachinus draco, Lin. 2 Ex.
Scomber scombrus, Lin. Mackerel. 1 Ex.
Caranx trachurus, Lin. Horse-mackerel. 1 Ex.
Gobius minutus, Gmel. 4 Ex.
G. pictus, Malm. 2 Ex.
G. microps, Kröyer. 2 Ex.
G. Ruthensparri, Euphr. 6 Ex.
Latrunculus Stuwitzii, Düb. & Kor. 5 Ex.
Callionymus lyra, Lin. 1 Ex.
Cyclopterus, lumpus, Lin. 1 Ex.
Anarrhichas Lupus, Lin. 1 Ex.
Centronotus gunellus, Lin. Tusk. 3 Ex.
Zoarces viviparus, Lin. 1 Ex.
Mugil septentrionalis, Günth. 1 Ex.
Labrus maculatus, Bloch, Nilss. 2 Ex.
do. 1 Ex.
Labrus mixtus, Lin. (mas) 2 Ex.
do. do. 1 Ex.
do. (fem.) 1 Ex.
Crenilabrus melops, Lin. 5 Ex,
Ctenolabrus rupestris, Lin. 12 Ex.
Acantholabrus exoletus, Lin. 2 Ex.
Gadus morrhua, Lin. Cod. 3 Ex.
do. Cod. 3 Ex.
do. Cod 1 year. 1 Ex.
do. — 10—11 months. 1 Ex.
do. — 8—9 months. 1 Ex.
do. — 6 months. 3 Ex.
do. — about 6 months. 1 Ex.

Gadus morrhua, Lin. Cod. 5—6 months. 2 Ex.
do. — do. 2 Ex.
do. — about 5 months. 2 Ex.
do. — 4—5 months. 4 Ex.
do. — 4 months. 1 Ex.
(medio August 1866).
do. — 3 months. 3 Ex.
(v. Cyanæa capillata).
do. — about 3 months. Ex.
do. — about 2½ months. 5 Ex.
do. — 2 months. 4 Ex.
do. — about 2 months. 24 Ex.
do. — 1½ months. 3 Ex.
do. — (Young recently hatched).
15 Ex.
do. — («Eggs»).
Gadus æglefinus, Lin. Haddock. 2 Ex.
do. Young (v. Cyanæa capillata). 1 Ex.
do. do. 1Ex.
do. Young. 3 Ex.
do. Haddock. 2 Ex.
G. merlangus, Lin. Whiting. 2 Ex.
G. minutus, Lin. 5 Ex.
G. Esmarkii, Nilss. 2 Ex.
G. poutassou, Risso. 1 Ex.
do. 1 Ex.
G. pollachius, Lin. 3 Ex.
do. 1 Ex.
G. virens, Lin. Saithe (Young). 2 Ex.
do. do. 2 Ex.
do. do. 3 Ex.
Merlucius vulgaris, Fleming. 1 Ex.
Phycis furcatus, Fleming. 1 Ex.
Molva vulgaris, Nilss. Ling. 3 Ex.
M. abyssorum, Nilss. 1 Ex.
Motella tricirrata, Nilss. 1 Ex.
Raniceps niger, Nilss. 1 Ex.
Brosmius vulgaris, Cuv. 2 Ex.

Ammodytes tobianus, Lin. 1 Ex.
Macrourus Norwegicus, Nilss. 1 Ex.
Hippoglossus vulgaris, Fleming. 1 Ex.
Zeugopterus megastomus, Don. 1 Ex.
Z. punctatus, Block. 1 Ex.
do. 1 Ex.
Pleuronectes platessa, Lin. 1 Ex.
Pl. microcephalus, Dan. 3 Ex.
do. 1 Ex.
Pl. limanda, Lin. 1 Ex.
Pl. flesus, Lin. 2 Ex.
Pl. Cynoglossus, Lin. 1 Ex.
Solea vulgaris, Quens. 1 Ex.
Salmo salar, Lin. Salmon. 2 Ex.
S. trutta, Lin. Salmon-trout. 1 year. 1 Ex.
do. do. 10 months. 1 Ex.
S. punctatus, Cuv. 1 Ex.
Hybrid of Trout. Salmo fario pater. Salmo alpinus mater. 6 years. 2 Ex.
Hybrid of Trout. Salmo fario mater. Salmo alpinus pater. 6 years. 2 Ex.
Hybrid of Trout. Salmo fario pater. Salmo alpinus mater. 5 years. 2 Ex.
Hybrid of Trout. Salmo fario mater. Salmo alpinus pater. 5 years. 2 Ex.
Hybrid of Trout. Salmo fario pater, Salmo alpinus mater. 4 years. 2 Ex-
Hybrid of Trout. Salmo fario mater, Salmo alpinus pater. 4 years. 2 Ex.
Hybrid of Trout. Salmo fario pater, Salmo alpinus mater. 3 years. 2 Ex.
Hybrid of Trout. Salmo fario mater, Salmo alpinus pater. 3 years. 2 Ex.
Hybrid of Trout. Salmo fario mater, Salmo alpinus pater. 2 years. 4E.
Hybrid of Trout. Salmo fario peter, Salmo alpinus mater. 1 year. 2 Ex.

Hybrid of Trout. Salmo fario mater, Salmo alpinus pater. 1 year. 2 Ex.
Salmo alpinus, Lin. 2 Ex.
Mallotus villosus, Müll. (mas.) 7 Ex.
Coregonus oxyrrhyneus, Lin. Var. 3 Nilss. 2 Ex.
C. albula, Lin. 4 Ex.
Thymallus vulgaris, Nilss. Har. 2 Ex.
Argentina sphyræna, Lin. 3 Ex.
A. silus, Nilss. Ascan. 1 Ex.
Esox lucius, Lin. 2 Ex.
Belone vulgaris, Cuv. 1 Ex.
Carassius gibelio, Bloch. 1 Ex.
Leuciscus rutilus, Lin. 2 Ex.
L. cephalus, Lin. 1 Ex.
Phoxinus aphya, Lin. 6 Ex.
Abramis Brama, Lin. 1 Ex.
Clupea harengus, Lin. North herrings. 4 Ex.
do. Winter herrings. 1 Ex.
do. id. 2 Ex.
do. id. 3 Ex.
do. id. 2 Ex.
do. Summer herrings. 2 Ex.
do. id. 1 Ex.
do. id. 1 Ex.
do. id. 2 Ex.
do. id. 2 Ex.
do. Herrings, about 7 months. 3 Ex.
do. id. 5 months. 3 Ex.
do. id. 4 months. 4 Ex.
do. id. 3 months. 8 Ex.
do. id. about 2½ months. 7 Ex.
do. id. about 1 month. 9 Ex.
do. id. early in May. 2 Ex.
Clupea sprattus, Lin. Spratt. 13 Ex.
Anguilla vulgaris, Turt. 1 Ez.
Conger vulgaris, Yarrel. 1 Ex.
Siphonostoma typhle, Lin. 2 Ex.
Syngnathus acus, Lin. 1 Ex.

Nerophis æquoreus, Lin. 2 Ex.
Chimæra monstrosa, Lin. (mas.) 1 Ex.
do. (fem.) 1 Ex.
Pristiurus melanostomus, Rafin. 1 Ex.
Acanthias vulgaris, Risso. 2 Ex.
Spinax niger, Bonap. 2 Ex.
Raya radiata, Donov. 1 Ex.
Petromyzon marinus, Lin. 1 Ex.
Myxine glutinosa, Lin. 1 Ex.

Stuffed Fishes.

Labrax lupus, Cuv. & Val. 1 Ex.
Cyclopterus lumpus, Lin. 1 Ex.
Anarrhichas lupus, Lin. 1 Ex.
Gadus morrhua, Lin. 1 Ex.
Molva vulgaris, Nilss. 1 Ex.
Conger vulgaris Yarrel. 1 Ex.
Acipenser sturio, Lin. 1 Ex.
Lamna cornubica, Gmel. 1 Ex.

CLASS 642.

217. BERGENS RØGERI, Bergen.

Samples of red herrings.

Established 1871, produces yearly about 3000 barrels red-herrings with about 20 work people.

Prize-medals: Copenhagen 1873.
Vienna 1873.
Viborg 1875.

218. HANDELSFORENINGEN, Bergen.

Collection of pickled herrings, salted and dried fish. (See No. 227).

219. JOHNSEN, Chr., Christiansund.

Salted and dried cod.

220. MOHN, Peter, Bergen.

Pickled herrings.

221. RØNNEBERG & SONS, Carl E., Aalesund.

Collection of salted and dried fish.

222. SØYLAND, L. B. Flekkefiord.

Pickled shark.

CLASS 643.

223. THE MUSEUM OF BERGEN, Bergen.

Crustaceans in alcohol.

Cancer Pagurus, Lin. 1 Ex.
Lithodes arctica, Lin. 2 Ex.
Homarus vulgaris, Edw. 1 Ez.

(Annellides) in alcohol.

Arenicola piscatorum, Lin. 6 Ex.

CLASS 644.

224. THE MUSEUM OF BERGEN.

Molluscs in alcohol.

Eledone cirrosa, Lamk. 1 Ex.
Ommatostrephes todarus, Del. Chiaje. 1 Ex.
Limnæa ovata, Drap. 24 Ex.
Litorina litorea, Lin.
Patella vulgata, Lin. 9 Ex.
Cyprina islandica, Lin. 8 Ex.
Sphærium corneum, Lin. 20 Ex.
Modiola vulgaris, Fleming. 10 Ex.
Mytilus edulis, Lin.
do.
Ostrea edulis, Lin. 18 Ex.

Plants in alcohol.

Ranunculus flammula, Lin.
Trichopharum cæspitosum, Hartm. (Farma fluitans).
Glyceria fluitans, Brown.

CLASS 646.

225. BORDEWICH & Co., Lyngvær, Lofoten.

Fish-glue (gelatine),
Fish-meal.
Caviar.
(see No. 89 & 272).

226. FØYN, Sven, Tønsberg.

Refined whale-oil	£ 36. 10	sh.	pr. tun.	
raw	do.	- 35.	«	—
do.	do.	- 34.	«	—

raw whale-oil £ 23. 10 sh. pr. tun.
Stearine £ 35, pr. tun.
(See No. 274).

227. HANDELSFORENINGEN, Bergen.

Samples of cod-liver-oil.
do. of fish-roes.
(see No. 218).

228. ROSINGS WIDOW, A., Christiania.

Biscuits of fish-meal.
(see No. 234).

The preparation of these nourishing Biscuits is an invention of the chemist Mr. Anton Rosing, who thought it applicable for the soldier in the field, for the sailor, and for the poor inhabitants of the Norwegian shores.

It obtained the first Prizes in **Malmö** and in **Bergen**, where it was exhibited in 1865, as well in **Stockholm** as in **Boulogne** in 1866.

The Biscuits which are now exhibited, were baked in the autumn 1866, and destined for the Paris Exhibition. But owing to the death of the inventor, the Biscuits were not exhibited at Paris.

The Biscuits have since been preserved in a stone jar with a not hermetical usual cover. Though nine years old, they are just as good as fresh, which seems to be of such interest, that they are now exhibited by the inventor's widow.

Description entitled: „Some essays and examinations on Fish Flour, as regards its application to food for the soldier, the sailor, and the poor people," is inserted in The Norwegian Polytechnical Journal 12th anniversary 1865. (P. T. Malling, Christiania).

CLASS 647.

229. DAHL, Jens, O., Havøen.

Cod-nets.
Herring nets.
Cod-lines.

Prize medals; Bergen 1865,
Boulogne s|m 1866.
Paris 1867.
Vienna 1873.

230. ERICHSEN, Ths., Bergen.

Samples of all sorts of fish-hooks used in Norway.

231. THE FISHERY MUSEUM, Aalesund.

Collection of nets, lines, and other fishing apparatus.
(See No. 191).

CLASS 648.

232. THE MUSEUM OF BERGEN, Bergen.

Model of a store for conserving ice and packing fish in ice (see No. 140, 195, 215, 216, 223, 224).

ANIMAL AND VEGETABLE PRODUCTS.

CLASS 651.

233. NORWEGIAN CONDENSED MILK Comp., Brødrene Thomsen, Christiania.

Condensed Milk.

The manufactory is situated in the neighborhood of Hamar in the richest tract of the country, where the cow keeping industry is furthest advanced, and where there is therefore access to an abundant supply of milk which moreover in respect of quality will bear comparison with that of any other country whatever, not excepting Switzerland.

Established in 1875 and constantly extending.

Apparatus and machines of or according to American invention. Market England, where there is demand for more than can be produced.

Report from the Melkerei Ausstellung in Frankfort am Main of 4—6 Decbr. 1875.

„Thomsen. Condensirte Milch.

„Die Prüfung (Dr. C. Møller, Bern und Dr. Petersen, Frankfurt) „ergab, dass dieses Product von gelblich weisser Farbe, Honig consi„stenz, reinem, süssem Geschmack (kein Beigeschmack) war. 1 Theil „in 5 Theile lauwarmen Wassers geløst, bildet eine weisse, milchige „Flüssigkeit. Demnach entspricht das ausgestellte Fabrikat allen Anforderungen, die man an ein derartiges Product zu stellen berechtigt ist."

234. ROSINGS WIDOW, A., Christiania.

Dried milk.

(see No. 228).

This chemical product, which was invented by Mr. Anton Rosing, obtained first prizes in **Malmö** and **Bergen 1865** and in **Stockholm** and **Boulogne s|m 1866**. When mixed with boiling water it is dissolved, and tastes like boiled milk. In coffee and tea it replaces cream and is excellent for chocolate.

The sample exhibited has been preserved since February 1867.

235. STEND AGRICULTURAL SCHOOL, Bergen.

Butter.

(see No. 206 & 209).

CLASS 652.

236. DALENS TANNERY, Flekkefjord.
Leather.

237. FLEKKEFJORD TANNERY, Flekkefjord.
Leather.

238. FOSSENS TANNERY, Flekkefjord.
Leather.

239. HAGEN, I., tanner, Christiania.
Leather and skins.

240. KLEM HANSEN & Co., Trondhjem.
Leather.
(see No. 188).

241. MEYER, Samuel B., Bergen.
Leather.

242. TØNNESEN, A., tanner, Christiania.
Leather.

CLASS 656.

243. DONS, Henrik, Christiania.
Preserved meats, game, poultry, soups, fish and anchovies from the *Christiania Preserving Comp.*
(see No 32).

This Company, the property of the exhibitor, was established in 1873, occupies about 20 work people and has hitherto only exhibited in Drammen 1873, when honorable mention was awarded.

244. EGIDIUS, PETTER, Bergen.
Anchovies and preserved herrings.

245. HELGESEN, H. A., Aalesund.
Preserved salmon, lobsters and fish-meats.

First class medals at several foregoing exhibitions.

246. HIORTH, A., Fredrikshald.
Anchovies.

Established 1864. Employs 10 or 12 persons.
Market chiefly Schleswig.
Medal of 1st class at the Copenhagen Exhibition in 1872 and the Exhibition at Viborg in 1875.

247. JUST, C. C., Christiania.

Anchovies.

248. LUND, Georg, Christiania.

Anchovies.

Hermetically preserved «Gammelost« (old cheese).

249. THE NORWEGIAN PRESERVING Comp., Mandal.

Preserved meats, poultry, fish, soups &c.

Established 1866, working staff 15 to 22 persons.

Of the production, which chiefly comprises ship's provisions and amounts to about 200,000 lbs. yearly, about half is exported to England, a trifle to Belgium, France, Germany and Sweden and the remainder is sold in Norway.

Preserved boiled Beef is sold at 6¼ d. per Pound, which will be found quite as cheap as salt meat, considering that the preserved meat is entirely free from bone.

The company has supplied the Norwegian Army since 1868.

Paris 1867. Bronze medal.

Copenhagen 1872. Honorable notice.

250. SMITH, Gina, Mrs., Christiania.

Anchovies.

The business was undertaken by the present proprietor in 1854. The quantity of anchovies prepared annually has increased gradually to 1200 whole kegs, 10,000 half kegs, 600 quarter kegs and 700 glas jars.

Markets, Norway, Sweden, Denmark, Germany. England and partly also America and Australia.

Medals obtained in:

London	1862,	**Bergen**	1865,
Stockholm	1866,	**Boulogne**	1866,
Paris	1867,	**Lysekil**	1868,
Naples	1871,	**Drammen**	1873,
Vienna	1873 (diploma of honor).	**London**	1874.

251. STAVANGER PRESERVING Comp., Stavanger.

Preserved beef, soup, mock-turtle-soup grouse, ragouts of grouse and of hares.

Preserved halibut, mackerel and various fish-meats.

Preserved milk and cream.

252. THORNE, Chr. Aug., Moss.

Preserved meats, poultry, game, fish, soups, vegetables &c., of all kinds.

Anchovies.

Established at Drammen in 1845.

Removed in 1864 to Moss, where the business has been continued uninterruptedly. The largest production was in 1874, when 26379 boxes of provisions and 29,462 kegs and boxes of Anchovies were prepared.

The working staff varies, according to the time of year, from 20 to 60 persons. In the preparing of anchovies the greatest number are employed, and mostly female children.

Steam power is not used; only a judicious combination of machinery for making the boxes, worked by hand. The greatest sale has been to the Norwegian and Swedish army and navy, as also to the Norwegian merchant fleet. Of the finer articles large quantities are sold to tourists; and for all the articles there is a great sale to provision merchants in ports such as Cardiff, Liverpool, Antwerp &c. where Norwegian vessels are in the habit of loading. The principal market for preserved vegetables is Christiania.

The chief article is Anchovies preserved with salt, sugar and spice in the months of September, October and November. Unfortunately this article cannot now be exhibited in perfection, as it is injured by exposure to warm weather. Anchovies can however very well be sent to North America in the month af October, and will keep good until April or May following.

Principal market for Anchovies, at present Germany, then Sweden, Denmark, Russia, Holland, England, France, and a considerable quantity is sold in Norway. Some quantity has also been sent to Australia.

In 1862 the products of this manufactory were exhibited for the first time in London; and subsequently they have appeared regularly at all the European exhibitions, and every where obtained prizes, namely:

London	1862.	*Honorable notice.*
Bergen	1865.	*Prize of first class.*
Stockholm	1866.	- - - -
Boulogne sur Mer	1866.	*Medal of 2d degree.*
Paris	1867.	*Honorable notice.*
Cassel	1870.	*Prize of first class.*
Naples	1871.	- - - -
Copenhagen	1872.	- - - -
Drammen	1873.	- - - -
Gothenburg	1873.	*2 Silver medals.*
Vienna	1873.	*Medal of merit.*

253. TELLEFSEN, Rina Mrs., Christiania.

Preserved game.

Potted game.

Anchovies.

The business was commenced in 1873. It comprises all the different sorts of preserved provisions. The export business is chiefly confined to Anchovies, of which the production is about 10.000 Kegs, which are sold to Norway, Sweden, Denmark, Germany, England and Russia.

Exhibited at **Berlin** at the Ausstellung des Deutschen Fischerei-Vereins 1873. **Silver Medal.**

At the international annual exhibition at **London 1873. Bronze Medal.**

At the Exposition maritime & fluviale à **Paris 1875. Bronze Medal.**

CLASS 660.

254. AASS, P. Ltz., Drammen.

Pale Ale.

Established 1860. Employs 14 persons.

Market chiefly local. Export Beer exhibited at Copenhagen in 1872 obtained „honorable notice.“

255. BRODERSEN, N. Drammen.

Norwegian Aquavit.

Established 1863.

Markets chiefly the East and West regions of Norway and especially Christiania.

Prize Medal in Copenhagen 1872 and in Drammen 1873.

Present price (without obligation) 26 sk, per Norwegian pot; for exported quantities of at least 500 pots 11 sk. per pot drawback.

256. CHRISTIANIA BREWERY, Christiania.

Pale Ale.

The brewery began its operations in 1855 with a production of about 1.200,000 litr. beer. Besides the increasing home trade, the business has in the later years been extended by export of beer to all parts of the world, such as Japan, China, East India, Australia, Africa, South America and partly also North America; so that the production in the last year has risen to about 3,000,000 litr.

The beer from the Brewery was exhibited at the Scandinavian exhibition in Copenhagen in 1872 obtaining a 1st class medal, and at the universal exhibition in Vienna in 1873 obtained a diploma.

The brewery employs 8 functionaries and about 100 workmen and workwomen, also a steam-engine of 12 horse-power.

In order to be able always to have bottles of excellent quality, the brewery has 3 years ago purchased Liljedal's Glasworks at Wenern, Sweden.

257. DAHL, E. C., Throndhjem.

Pale ale.

Specification:

Pale ale, brewed in 1870, sent to Rio Janeiro Septbr. 1871, returned therefrom May 1873.

Pale ale, brewed 1871, sent to Rio Janeiro August 1872 and returned Septbr. 1874.

Pale ale, brewed Decbr. 1873, sent to Rio Janeiro Septbr. 1874 and returned in January 1876.

Pale ale, brewed in Decbr. 1873, sent to Rio Janeiro Septbr. 1874 and from there to Philadelphia in January 1876.

Pale ale, brewed in 1874.

From the above dates it will be observed that Pale Ale from this Brewery has kept in good condition during about 6 years, having passed twice the equator, been stored for years in Rio Janeiro and after the return to Norway kept in a heated room.

258. FORSETH & Co., O. N., Christiania.

Pale Ale.

259. FRYDENLUNDS BREWERY, Christiania.

Pale Ale.

The brewery commenced its operation in 1860, and was, after a large fire in 1872, partially rebuilt and enlarged, on which occasion all was arranged according to the newest models, and all the newer machinery procured from Norwegian, Swedish and German manufactories.

The brewery employs 140 workmen & 18 horses, also 3 steam-engines and a hydraulic engine, together of 35 horse-power.

The workmen have their own sick-fund and a pension-fund for worthy superannuated workmen, to found which the brewery has given a considerable capital.

The production was in:

1860 — 6,930 barrels malt and 1,322,339 pots beer
1875 — 16,780 — - - 3,644,235 - -

For this there is generally used Danish, German and French barley, also Bavarian and Bohemian hops.

About ⅔ of the beer produced is sold in Norway, and ⅓ is exported chiefly to countries out of Europe.

Frydenlunds beer brewery was the first in Scandinavia that began to export beer to tropical countries. The export business was begun in 1868 on a smaller scale and has subsequently by regular increase acquired its present importance. The beer, which is especially noted for its remarkable keeping quality, has wherever it has been introduced enjoyed entire appreciation, and in three exhibitions where it has been represented, namely in **Drammen**, **Vienna** and **Santiago**, been honored with prizes.

260. HAMAR BREWERY, Hamar.

Pale Ale.

The Brewery has been established for 20 years. The work is assisted by a steam engine of 8 horse power. Business chiefly in export-beer. 3 to 4000 barrels of malt used annually, Working staff 30 to 50

Exhibited in Vienna 1873, obtained the medal of merit.

In order to shew the keeping quality of the beer, 24 half bottles are now sent to the exhibition, which contain beer brewed in 1871 and which have crossed the equator 4 times.

261. KONGSBERG BREWERY, Kongsberg.

Pale Ale.

The brewery is worked by steam power. The brewing of export beer began in 1873. Sale to Honkong, Japan and South America.

262. LYSHOLM, Jørgen B., Throndhjem.

Norwegian Aquavit and Punch.

Specification:

	Prices delivered free in Hamburg.	
	in casks pr. litre	in cases of 12 bottles including bottles and packing.
Aquavit No. 1	1 Shill. Sterl.	15 shill. 6 d.
Line Aquavit (having passed the equator)		19 — 0 -
Aquavit, 10 years old		21 — 4 -
Punch, prepared from the finest arrac		22 — 0 -

First Prize medals at the Exhibitions of **Stockholm**, **Copenhagen** and **Vienna**.

263. POULSEN H. & Co., Christiania.

Arrac Punch.

Drammen 1873. Mention honorable.

264. RUUD, J. A., Christiania.

Fine old Norwegian corn brandy.

Punch.

Pale Ale from Moss brewery.

Successor to Chr. Bennecke, established 1815. Distillery, wholesale and retail business in wine and spirits. Export trade with Norwegian Aquavit and Ale. Partakes for the first time in an Exhibition.

265. SALICATH, Oscar, Christiania.

Punch.

(see No. 269).

266. TANDBERG, Frants, Drammen.

Norwegian Aquavit.

Distillery established in 1853.
Honorable notice in Drammen in 1873.
Commission stores in America.
Alphonse Stephani & Co. Philadelphia and **A. Stephani & Co. New York.**

267. WRIEDT, Chr., Drammen.

Pale Ale.

CLASS 661.

268. ANISDAHL, R. O., Skien.

Drops and peppermint.

269. SALICATH, Oscar., Christiania.

Drops

(see No. 265).

Established 1875 in Christiania; the only manufactory which produces the genuine Swedish Arak-punch.

The manufactory of drops was established in Christiania 1873.

No export trade at present; as the duty on the raw material is high, and no drawback is granted.

MACHINES, IMPLEMENTS AND PROCESSES OF MANUFACTURE.

CLASS 670.

270. CATHRINEHOLMS IRON WORKS AND FOUNDRY,
Fredrikshald.

6 ploughs,
1 rolling-harrow.
(see No. 24 & 88).

CLASS 674.

271. ROSING, Ulrik, Christiania.

Frontiruptor (mask for killing-oxen).

Established 1864. Manufacturer of frontiruptors. Agency in agricultural implements and machines.

AGRICULTURAL ENGINEERING AND ADMINISTRATION.

CLASS 681.

272. BORDEWICH & Co., Lyngvær, Lofoten.

Fish-guano.
(see No. 89 & 225).

273. HOLST, Chr., Christiania.

Head Steward to H. M. the King.

Samples of Norwegian artificial fertilizers, from the agricultural Museum of the Royal Domain Ladegaardsøen.
(See No. 42, 197, 203).

274. FØYN, Sven, Tønsberg.

Guano of whale bones and flesh,
Gold. Doll. 4. 75^c pr. 100 Kilos.
(see No. 226).

275. THE NORWEGIAN FISH-GUANO COMP.,
Christiania.

Fish-guano.

The Company which was founded in 1856, was the first to give the impulse to the manufacture of Norwegian fish-guano in which now a a dozen similar establishments are employed, converting a worthless raw material into a merchandise, that brings in no small revenue to the country. The manufactory prepares at present about 20,000 centners yearly.

The Norwegian fish-guano Company's fish-guano has obtained prizes in the following places.

Dresden	1869:	*Gold medal.*		
Odense	1863:	*Silver medal*,		*1st class.*
Aarhuus	1865:	—	—	—
Gothenburg	1871:	—	—	—
Copenhagen	1872:	—	—	—
Moscou	1872:	—	—	—
Vienna	1873:	*Medal of progress.*		

WOMEN'S WORKS.

276. AMUNDSEN, Miss Eliza, Tromsø.

1 embroidered table-cover .	£	13.	0.	0.
1 fire-screen	«	11.	0.	0.
1 white embroidered table-cover	«	4.	10.	0.
1 do. do. smaller	«	3.	10.	0.
2 Sofa-cushions, each . . .	«	4.	0.	0.

277. ARENTZ, Mrs. Annette, Christiania.

Sopha-carpet of small pieces of cloth.

Knitted baptismal-robe.

278. BRODERSEN, Miss Hanna, Arendal.

Infant robe. Doll. 6.

279. BUSCH, Miss Anna, Bergen.

2 Anti-macassars, each Doll. 1. 75.

280. CARSTENS, B. A., Vossevangen.

Antique embroidered	linen border		Doll.	9. 00.
do.	do.		-	8. 00.
do.	do.		-	4. 00.
do.	do.	each	-	3. 00.

281. CHRISTIANIA TEGNEKONTOR.

2 embroideries (prices affixed).

282. DAHL, Mrs. Olla, Flekkefiord.

Morning-cap. Doll. 5. 00.

283. DJØNNE, Miss Anna Asbiørnsdatter, Kinservik.

Woman's dress from Hardanger.		Doll.	24. 00.
Bride-crown -	ib.	-	11. 00.
Tabacco-bag		-	1. 10.
A pair of sleeves		-	0. 85.

284. DOMAAS, Mrs. Marit, Vestnæs, Romsdalen.
1 woollen shawl.
1 piece of woollen cloth.
1 petticoat (hand-sewn).

285. DRIVDAHL, Miss, Martine, Flekkefjord.
1 Anti-macassar. Doll. 3. 00.

286. DYBWAD, Miss Petra, Trondhjem (14 years).
Embroidered lamp-plate. Doll. 1. 60.

287. DÆHLI, Marthe, Furnæs, Hedemarken.
A shawl, home-woven.

288. EIDE, Mrs. Anne, Johannesdatter, Graven.
Bride-dress with crown from Hardanger. Doll. 56.
Puppets.
Embroidered shirt.

289. ENGH, Mrs., Christiania.
Toilet-cushion (not for sale).

290. FØYN, Miss Cathrine, p. t. Copenhagen.
6 embroideries on cloth, each of them under glass and framed. Prices affixed.

291. GADE, Miss Emma, Bergen.
Embroidered handkerchief. Doll. 3.

292. GADE, Miss Ingeborg, Bergen.
Embroidered Silk cradle-cover. Doll. 15.

293. GRIMSGAARD, Mrs. Marie, Sarpsborg.
A complete bed-chamber furniture, in miniature, Price Doll. 100.

294. HANSEN, BROTHERS, Christiania.
Collection of hand- and machine-knitted woollen articles of clothing.

295. HEIDENREICH, Miss Augusta, Christiania.
A pair of Anti-macassars, each Doll. 3.

296. HOLST, Miss Pauline, Drammen.
Shell-works:
1 Garniture. Doll. 10.
2 sets. Doll. 13. 50.
1 long flower for the hair. Doll. 8.
Bronze Medal, Drammen 1873.

297. JOHANNESEN, Miss Winda, Christiania.

Knitted Long-shawl. Doll. 16.
Knitted Pocket-handkerchief. Doll. 4.
Tie. Doll. 3.

298. JÆGER, Mrs. Amalia, Rinde, near Bergen.

Comforter. Doll. 14.

299. KAURIN, Mrs. Lina. Flekkefjord.

Child's collar embroidered. Doll. 1. 50.

300. KAURIN, Miss, Peruva, Flekkefiord.

Child's-collar embroidered. Doll. 2.
Nupperel-cap. Doll. 3. 50

301. KRETZ, Miss Anna. Christiania.

Collection of works in feathers, straw and wood.
(prices affixed).

302. LARSEN, Miss Laura, Moss.

Pressed flowers.

Vienna 1873, Anerkennungs-Diplom.
Drammen 1873, Mention honorable.

303. MIDDELTHON, Miss Hanna, Christiania.

Embroidery for a Jewel-case	Doll.	5.
Pocket-handkerchief . . .	«	5.
Work-bag	«	3.
do.	«	5.
A pair of child's stockings .	«	1.
Embroidered table-napkin .	«	12.

Drammen 1873. Bronze medal.

304. Mrs. L.

1 counterpane.
4 pillow-cases. } price Doll. 1000.

Hand embroidery.

The work is executed in frames, with hair specially prepared. There is nothing inserted, but all the ground is covered with pins, about in the same manner as in the manufacture of lace.

The enormous expenditure of time and labor lavished on such objects of luxury as here in question, may be accounted for by their having been executed in the year 1830 by young girls, serfs on the estate V, near Moscou, and by the special local circumstances of the time. Several of the rich noble landowners in Russia, whose intention it was to treat their serfs conscientiously, had also caused buildings to be arranged wherein the young serf girls were employed in hand work, especially in embroidering and making lace. The finished work was not sold, but used by the masters either for themselves or for making presents. Under these circumstances, time, labor and expence were not regarded.

305. MØRCK, Mrs., H. B., Helgeland.

1 Fishermen's bed-cover Doll. 21.
1 do. do. « 19.

306. NEUMANN, Miss Augusta, Stavanger.

Pocket-handkerchief (not for sale).

307. REYMERT, Miss Caroline, Throndhjem.

2 embroidered pocket-handkerchiefs each Doll. 15.

308. SCHARFFENBERG, Miss Thrine. Høland.

7 Psalegraphies, cut with a pair of scissors without previous design. Representing scenes from various poems. Prices affixed.

309. SCHRIVER, Miss Anna, Christiania.

Embroidered table-napkin. Doll. 12.

310. STEFFENSEN, Miss Martha.

Embroidered table-cover. Doll. 17.

311. SUNDT, Miss L., Christiania.

Bread-napkin. (Not for sale).
2 embroidered napkins, each Doll. 12.
Pair of Bread-napkins. Doll. 6.

312. SUNDT, Miss R., Christiania.

Embroidered pocket-handkerchief. Doll. 30.
Comforter. Doll. 13.
Anti-macassar. Doll. 8.
1 Pair do. Doll. 8.
Knotted collar. Doll. 4.
Collar, sewn in the country (Hardanger). Doll. 1.
Child's petticoat. Doll. 2.

313. SØNNICHSEN, Miss, Christiania.

Down-cushion. Doll. 6.

314. SØRENSEN, Miss Petrea, Menstad pr. Porsgrund.

Key-closet.

315. SØRLIE, Miss Mathilde, Christiania.

Embroidered Sofa-carpet. Doll. 20.

316. VAAGE, Mrs. Janna, Flekkefiord.
Embroidered Sofa-cushion. Doll. 20.

317. WASHØE, Mrs. Anina, Stavanger.
2 embroidered chimney-chairs, each Doll. 50.

318. WELTZIN, Miss Bergen.
Sample of worsted.

319. WIGGEN, Miss Pauline, Trondhjem.
Knitted white woollen handkerchief. Doll. 12.

320. WILHELMSEN, Miss E., Ulvik.
Embroidered table-cover. Doll. 5. 50.

321. ØWRE, Mrs. Adolphine, Tromsø.
Painted table. £ 4.

(APPENDIX).

THE FISHING INDUSTRY

OF

NORWAY

BY

H. B.

To the high north, to the land of Sagas and bards, old Norway — Fashion and Curiosity bring every year thousands of Tourists, Artists and Savans who hope to find enjoyment or matter for artistic representation and research; and very few return unsatisfied.

Travelling in Norway does not indeed offer the conveniences of Switzerland. Railways and diligences do not in all directions traverse the country, nor do we find any splendid Hotels. We drive rapidly in light one-horse carioles on well constructed roads up hill and down. Very tolerable small steam vessels connect the shores of the lakes and fjords; and the simple fare at the stations where the horses are changed, seasoned with fresh air and enjoyed with a glad heart, invigorates the active traveller.

The natural scenery of the country is not however inferior to that of Switzerland.

In the eastern part, we find large plains or wide valleys with beautiful lakes and rich forests; in the western part, the valleys become more narrow, and are closed in by lofty rocks, often nearly perpendicular and sometimes covered with eternal snow, from which splendid waterfalls rush down: — smiling pastures, frightful ravines, rich meadows and desert tracts, thousands of beautiful and magnificent views, meet the eye of the painter in the interior of Norway.

It is inhabited by a robust, straightforward thoughtful population, proud of their freedom; a people knowing as yet but little of the shady side of civilisation.

But the coast of Norway would probably be, even more than the interior, attractive to the foreigner, and especially to the inhabitant of the interior of the continent.

We will accompany on a fine summer day one of the large steam vessels which every week make the voyage from Hamburg to Vadsø. How the ship winds through endless labyrinths among the innumerable larger and smaller islands, which lie off the west coast of Norway as if they had been placed there by Providence to protect the continent against the billows of the north sea. Now and then the vessel touches at a small town to discharge or take in cargo, stays a few days at Bergen and Throndhjem, and then steams on without interruption, always protected by the islands, through the clear nights up to the North Cape and thence eastward to the Russian frontier. In the southern part of the coast, the eye frequently discerns, as well on the islands as on the main land, fertile meadows, small barley, oat and potato fields and abundant forest vegetation; but black and grey cliffs of the most wonderful forms generally close the prospect. The more we approach the North the grander the cliffs bocome; while the vegetation gradually decreases. When we arrive at the 70th degree of latitude, we can only discover here and there single green spots surrounding a small hut, but else only grey, brown or black rocks, the summit scantily covered with heath (Calluna vulgaris).

But in the night, the red midnight sun throws over the scene an enchanting splendor which will remain for years before the eye of the spectator.

The thought will naturally force itself on the mind of the traveller along the Norwegian coast, and especially when he is passing the arctic circle: »There must be very little sown here, very little harvested; where can the inhabitants of the huts which seem to attach themselves to the sides or in the clefts of the rocks, find the means of support for themselves and their families?

And if this question should be put to the inhabitant of such a hut, he would probably answer proudly: Out there on the billowy ocean is our field; there we plow and harvest in the winter, when the sun is only for 2 or 3 hours daily above the horison, in the small open boat which you see in the little bay close to my house; and the field is as good and fertile as the best in your rich sunny country.

»I should like to see the plowing and harvesting in your field« thinks perhaps the traveller; let us lead him then first into one of those huts on the coast or in the fjords between the 64th and 69th degree of latitude, at the end of December after Christmas during the preparation for

The Great Cod-fishery.

Here is lively activity. Men and children are occupied in renewing and mending the nets, cords and lines; the women in sewing and washing the woollen and leathern clothes, in baking the large rye loaves or the flat bread, as thin as a wafer, of Barley or Oat meal, in packing butter, cheese, dried and cooked meats for the projected journey to the province of Nordland, the Lofoten isles. Towards the middle of January everything is ready. On the first favorable weather, the implements, clothes and provisions &c will be shipped in the boat; the crew take leave of their families, and away they go with sail or oars, according to the state of the wind, to Lofoten.

Lofoten is the name of the group of Islands extending south west from the main land from 68° 36′ to 67° 25′ and forming with it the great Westfjord. The permanent population of these islands is scarcely more than 25.000 souls supported chiefly by fishing. We find indeed, on some of the larger islands, very good and well kept meadows. Besides the dwellings of the permanent population, there are in every bay which is in any degree protected from the Ocean, a number of huts which the proprietors, who are also frequently merchants and fishermen, have built, and let out to the strange fishermen during the season. These huts which usually are arranged for one or two boats' crews, 6 to 12 persons, consist each only of one room with board beds along the wall, and one other room for keeping the nets, cords and lines, the barrels for the roe and oil, as also for the provisions and clothes.

The huts are constructed of rough boards and covered with turf. As they are occupied by a disproportionately large number of people, who moreover hang up in the same room their wet and dirty clothes to dry, the air within is naturally extremely bad. But the fishermen care very little about this; they are content if they can only get a roof overhead and a hard bed; for sometimes they have to do without even this.

When in one fishing place or another, the catch is very productive, so many fishermen flock thither that many can not get room in the huts. They manage in such case to pull their boats on shore, turn them over and with the help of the sail to arrange a dwelling for the night; but they are often obliged to camp out at night in the open air and in the deep snow.

The food of the fisherman is as simple as his lodging. In the morning the boy makes the coffee, which every one takes before going out to fish; dinner consists of meat or bacon with sometimes bread and sometimes potatoes; for supper fresh fish or boiled fish-liver and bread.

The boats which are used in taking cod with nets, have a length of 36 to 40 feet and a width of 9—10 feet with a depth of only 3 feet. The heigth of the only mast, to which is attached only one large square sail, is about 24 feet. Each boat has 10 or 12 oars, with which the powerful crew can propel it rapidly against the wind.

The crew, usually consisting of 5 men and a boy, elect one of their number to be captain. No general is more punctually obeyed than this captain; for his men well know that their lives and property depend on his capability and on their prompt execution of his orders. On this account in selecting the captain, only energy, coolness and knowledge of the channels are taken ints account. Age has no influence on the choice; but no fisherman above the age of fifty is taken as captain; for he is at that age supposed to have lost something of his strength and courage, still less would property influence the choice; for it frequently happens that the servant is captain of the boat, while his master has to row or work the sail. Not only is the captain chief of the boat while at sea, but all purchases and sales take place in his name, and he represents his crew as regards their responsibility to the public authorities. Nothwithstanding his dignity, he has no greater share in the produce of the catch, than any other of the crew. The position of captain is only a position of honor; but it gives to him who holds it a real authority among the fishermen, and raises him in his own estimation. As soon as a fisherman has been elected captain, his gait becomes prouder, his language more civilised, his dress is more attended to; he feels himself above the other fishermen.

The boats equipped for the fishing with lines are usually smaller than those which fish with nets. Their crew consists generally of only 3 or 4 men.

Already in the 9th century, the history of Norway speaks of the riches of the Westfjord in the cod-fishery, and describes the Lofoten islands as the assembling place for the coast populations of the neighborhood. No single year is known in which this fish has not in greater or smaller masses visited this tract of the sea.

In tho month of December, the first shoals of cod (Gadus morrhua Linn) usually appear on the banks along the outside of the Lofoten group, and on the west side of the large islands Andø and Langø (Vesteraalen) where the permanent population, sometimes assisted by some boats from the interior, begin the catch and continue it until some time in the month of March.

On these banks there are usually found great masses of fish; but as the fishermen are not here, as in Lofoten, protected against the open North Sea, as the water along the coast is rather shallow, and the ports are few and unsafe, the fishing can only be carried on in good weather, which is seldom to be enjoyed at this season of the year. The produce of this fishery, in which 6 to 800 boats take part, seldom exceeds 5 or 6 Millions of fish.

In the Westfjord on the other hand, the Lofoten group affords protection against the north and north west winds, and the many bays which enter the land on the inside of the islands afford good and safe refuge for boats and ships.

From the island Røst to the strait Raft (Raftsund) there extends for a length of about 15 miles, a fishing bank of considerable width at a depth of 40—50 fathoms at a distance of ½ to 2 miles from the land along the Lofoten group. This bank is the chief field of operation for the population of the province of Nordland. Outside of this bank, there is another great fishing-bank, which however, on account of its great distance from land, 3 to 5 miles, is not much visited.

Already in the last half of the month of December, the inhabitants begin to examine the environs of the Lofoten islands with baited hooks, to discover whether the precursors of the shoals of cod have arrived in the West-fjord; and the firstlings are received with great exultation. Before the middle of January however, the fish seldom comes in great masses, and usually chooses for its entrance, the openings between the islands Moskø and Røst, or between Røst and Værø, the inhabitants of which places pursue the fish with all their might in the passage, and usually, if the weather is fine, with good success. Now the shoals distribute themselves gradually on the bank, in order to select spawning places. As however the bank is, as before mentioned, of very great area, it is not possible to foresee where the densest masses of fish will establish themselves. Sometimes they remain on the western side of the bank; sometimes they continue their course to the eastern side where most of the fishermen remain, because they are more protected against the sea, and because the bank approaches there nearer to the coast than towards the mouth of the fjord.

Spawning takes place usually in the last half of the month of March, and not at the bottom, but in the middle of the water, which is rendered quite turbid by the roe and milt.

At this time the fish are very restless and go easily into the nets; it does not however last long. In the beginning of April the cod begin to retire into the open sea, and the fisherman pursue them as far as Balstad and Moskenæs, where many hundred boats fish to the end of the month.

The codfish are taken in Lofoten in 3 manners, namely: with hand-lines, with set-lines and with nets.

Generally only the poorest fishermen use hand-lines alone; not having the means of obtaining the more expensive set-lines and nets.

The produce of their labor amounts on the average to 50 fish daily for each man; sometimes however they get 100—120. For bait they use fresh or salt herrings; and, when these are not to be had, they lake pieces of the cod fish or of their roe.

A boat equipped for set-line fishing must have at least six sets or 24 lines each with 120 hooks, 6 or 8 feet distant, on fine snoods of hemp or cotton 16—20 inches long. The bait is the same as in hand-line fishing. According to the number of the crew and tho the local circumstances, the lines are set ont in lengths of from 500 to 2400 hooks, usually in the afternoon, at the time prescribed by the proper officers at each fishing station, and only in the places indicated by them. If the fish rise from the bottom, then the lines also are raised to the same height as the mass of fish, by means of glass floats. On the following morning the lines are taken up. If the fish are near to the coast, so that not much time is taken up in rowing ont and home, the fishery with set-lines can take place also during the day. The produce of this fishery is of course very variable. On the average it may be taken as 50—60 fish daily per set (Bak).

The fatter the fish are, the less they care for the bait; and during the spawning time, they will scarcely take any notice of it. Therefore the more wealthy fishermen provide themselves with nets as well as with lines. The boats equipped for fishing with nets have commonly 60—70 nets on board. The width of the net varies between 10 and 20 fathoms; the length, between 25 and 60 meshes, measuring 80—95 millimetres between the knots on each side. The nets are kept upright in the water by floats of hollow glass (an invention of Mr. Christopher Faye in Bergen), wood or cork. In Lofoten they use almost exclusively glass floats. Generally 16—20 nets are bound together and set out in the afternoon in one length and in such manner as not to become entangled with the lines. If the weather permits, the whole apparatus is taken up on the following morning. A produce of 4—500 cod is considered satisfactory. If the take exceeds 6—800 fish, the fishermen are obliged to leave part of the nets in the sea until the afternoon; as the boats can seldom hold a larger number of fish besides the nets and the crew.

As soon as the fishermen come on shore with the catch, they have their dinner; after which they proceed to clean and prepare the fish and their entrails. The roe is either sold fresh to the merchants at the station, or salted by the fishers in the barrels brought with them. The heads and backs find a sale in the guano factories, of which there are several in Lofoten; the former are also dried by the fishers themselves and taken home, where they serve as food for the cattle. The liver is either supplied to the manufactories of medical oil, or the oil is prepared from it by the fishermen themselves. The body is either hung up and dried as Stockfish, or sold to the rock-fish salters, who are present at every station on shore or in vessels.

Partly by reason of the great herring-fishery, which since some years has been carried on in the province of Nordland during the winter months, and partly as a consequence of the discovery of some small fishing banks along the coast of the main land between the 65th and 68th degree of latitude, the number of boats fitted out for Lofoten has decreased during the last 5 years. According to the official census, there were assembled in 1872

1753	boats with crews amounting in all to fitted out for net-fishing.	8546 men
1957	boats with crews amounting in all to fitted out for set-line-fishing.	6949 men
533	boats with crews amounting in all to fitted out for hand-line-fishing.	1278 men
4233.		27167

The failure of the large herring fishery in 1875 has however already contributed to raise the number of fishers at Lofoten in the present year. In the beginning of March the number of boats was stated to be nearly 5000.

The total produce of the catch has varied during the last few years between 15 and 25 millions. This quantity seems rather small when we consider the great number of boats, fishers and implements, as also the abundance of fish on the banks; but it is to be remarked that the stormy weather which often rules for weeks together in these regions during the winter months, makes it frequently impossible for the fishermen to go out to sea. On the average, the fishing is not carried on more than two days in the week.

The gains of the different boats are, even in the same places, very different, and do not depend only on the number of fish taken, but also on the price of the merchandise. Those who use nets generally obtain the greatest gross proceeds often 10—12000 fish 10—12 barrels oil and 10 barrels roe, worth 700—800 Dollars, or fully 120 dollars per man. The set-line fishers consider a gross amount of 100 dollars per man as a very good result; but their outfit is not nearly so expensive as that of the net fishers. The implements of the hand-line-fishers cost still less, and yet they often succeed very well, especially when the cod is lean and consequently greedy. The greater part of the fishermen who go to Lofoten, carry on the fishing for their own account. They own a fifth or a sixth part of the boat and implements and take the same share in the profits. There are however some who hire other fishers, sometimes the crews of several boats, for a payment for the season of 15 to 20 Doll. and food, furnishing also two overcoats of leather or oiled cloth, which are returned after being used, as all the implements are likewise. Some of the hired fishermen keep themselves; these earn usually about 40 Doll. in the season from 15 January to 14 April.

As already remarked, the cod fish generally begins early in April to leave the fishing banks of the Westfjord, and at the same time, occasionally even at the end of March, many of the fishermen go away; some in order to take part in the codfishery in Finmark, some to return home, while the remainder continue to pursue the cod in the Westfjord until the fish get out into the open sea. At the end of April the numerous fishers' huts on the Lofoten islands are nearly all empty; only the permanent inhabitants retain their dwellings.

The cod-fishery on the smaller banks along the coast, from the 24th to the 69th degree of latitude, occupies about 2000 men from the nearest environs of the several banks. The total produce of their labor seldom exceeds 2—3 millions of fish; but it is often more profitable than that of the fishing in Lofoten; as the men remain in the vicinity of their dwellings, from which they can supply themselves with all necessaries.

The cod-fishery in Finmark is of far greater importance and appears likely soon to surpass even that of Lofoten in yield.

Properly speaking there are in Finmark two independent fisheries carried on nearly at the same time.

While great shoals of cod come into the West fjord, others seek the banks on the outside of the coast from the 69th degree of latitude to the North cape, in order to spawn. Small shoals of cod with roe and milt appear up to Vardø. The latter are pursued by the inhabitants of the neighboring coast districts and often give a very good yield. But this is generally of small importance in comparison with that of the so-called capelin fishery, which is usually carried on from the Russian frontier to within a few miles of the North cape, and for which the outfits increase every year.

At the end of February — sometimes earlier — the appearance of millions of gulls (Larus glaucus, Larus eburneus) in the horison, and the blowing of a number of whales on the surface of the Ocean, in the vicinity of the North cape or frequently somewhat more to the east, announces that the small capelin (Mallotus villosus, Osmerus arcticus) the favorite food of the cod-fish, is approaching the coast; and the cod fish follow in immense masses. Now the great point is above all to get hold of the capelin for bait. Every where when this fish comes into convenient bays, it is stopped by sweep nets and taken by all possible means. As soon as the bait is obtained, the cod-fishery begins, chiefly by means of set- and hand-lines; nets are less frequently used; as the cod go near the surface or only a few fathoms below, and the fisherman has fully enough to do in baiting the hook and drawing in one line.

Until about 10 years ago, the capelin fishery was carried on exclusively by the scanty population of Finmark; snd a total catch of 5—6 millions was considered as a rich one. After attention had been attracted to the richness of this fishery, thousands of fishermen from the province of Nordland, after finishing their Lofoten fishery, flocked to Finmark, either in their boats or with the post steamers; and in the last years the Finmark fishery has yielded 12—15 millions. In the year 1873, the yield has even exceeded the highest of these figures. Towards the end of May, the capelin usually retire towards the North Sea accompanied by the masses of cod which the fishermen pursue to a distance of some miles from the coast. But in the Varanger fjord, they remain sometimes until June.

In the beginning of May 1872 there were, according to the official statistics, engaged in the Finmark cod-fishery:

3727 boats with crews amounting in all to 13224 souls
with set and hand-lines,
952 boats with crews amounting in all to 3686 —
with hand-line only.
4697. 16810.

In Finmark the weather is still more unfavorable than in Lofoten, and the harbors are almost all bad; otherwise the catch would certainly yield a far greater produce. The gain of the fisherman is however often rather great; for it is not seldom the case that the inhabitants of Finmark, who work during the whole season, gain 100 Sp. per man; and the Nordland fishers, who work only 4—6 weeks, gain 60 Sp. per man. In 1871 and 1872 some fishermen from Finmark brought home even 150—200 Sp. each. In the present year 1876, neither capelin nor cod have appeared in east Finmark up to the 10th May; and the fishermen have returned home without any catch.

As in Lofoten, so also in Finmark, most fishermen work for their own account. Where this is not the case, the hired people receive usually half the amount of the catch; the other half belonging to those who furnish the boat and the tackle.

Several of the inhabitants of Finmark also let out boats to the fishermen coming from Nordland, and receive as remuneration usually one sixth of the catch.

Nearly all the boats' crews sell the bodies of the cod-fish, as well as the livers, to the merchants on the coast or to the numerous vessels which prepare rock-fish and oil at the fishing places. Only those fishermen who are at home in the Varanger fjord, and carry on their fishing in the neighborhood of their dwellings, hang up the cod to dry as stock-fish for their own account.

We have still to mention a cod-fishery of great importance, namely that which is carried on between the mouths of the Throndhjem fjord and cape Stat from 63° 40′ to 52° 10′.

On the outside of this coast tract, there lie among several others, some very rich fishing banks 3 or 4 miles distant from the shore. Every year towards the end of January, great shoals of cod came there to spawn, remaining there until the middle of April, after which time they mostly return to the great deeps.

In the latter half of January, the fishermen from Romsdal, Nordmøre and Søndmøre assemble themselves on the most distant islands and begin the fishing with set- and hand-lines, afterwards using chiefly nets. In consequence of the great distance of several of the banks from shore, the fishing is here not only more dangerous, but also more laborious than in Lofoten and in Finmark. Also here they generally use only open boats, about 35 feet long, with a crew of 8 men.

These boats have a very different shape from those of Nordland, and are calculated to withstand the billows of the open North Sea. Moreover their only sail is so shaped and arranged that the boats can go very near to the wind; in order that even with contrary wind, they may be able to reach the shore in the evening.

On the coast of Søndmør, which is most distant from the bank, the fishermen usually go out to sea at 3 o'clock in the morning and cast out their nets, returning on the following morning to take them up. After taking out the fish caught in the nets, they set their nets again and return with their catch to the shore, where they seldom arrive before in the afternoon.

In the month of April, when the nights are already rather clear, and the cold is over, the boats often remain a few nights out at sea in order to avoid going backwards and forwards every day.

As the current on these banks is very strong, the fishermen of the coasts use mostly wooden floats for their nets instead of glass; because the latter drift more easily, and thereby many nets would be lost; while the wooden floats, when they are thoroughly wet, can do no worse than sink to the bottom, whence they can be easily raised.

As bait for the lines, fresh herrings are usually employed. When the shoals of cod-fish are thick, many fishermen use no bait, but only a line with a large hook, above which hook, at a distance of 2 feet, and 4 to 6 inches from each other, there are attached some small fishes of tinned sheet iron, to attract the cod by their glitter. The fisherman jerks the line continually, and the hook catches many a curious fish staring at the sparkling tin. Of course many fish are wounded without being taken. The number of boats occupied in the great cod-fishery on the coast between the Throndhjem fjord and cape Stat, amounts to about 2000 with a crew of 15000 men. The total produce of their labor seldom exceeds 6—7 millions of fish. Since a few years, there are also about 20 decked vessels of about 40—60 tons burthen, taking part in the cod-fishery on the banks of Søndmøre with good result.

On this coast-tract, is it not only the home-dwellers who carry on the cod-fishery for their own account, but also the merchants from the towns Christiansund, Molde and especially Aalesund, fit out every year a good many boats for this fishery. Although the crews bave not so long a journey to the fishing stations as those of the Nordland coast, and their season does not last so long, they are yet more highly paid, getting 35 to 30 Doll. besides food. The captain has moreover 5 % of the produce. But as before mentioned, the fishermen risk their lives every day; for the weather changes often in the day-time, while they are in the open sea on the bank, and the open boat offers too little security against wind and waves.

Also between cape Stat and the mouth of the Varanger fjord, (from the 62nd to the 59th degree of latitude) there is no lack of good cod-banks. But these have been since the beginning of this century very little worked, because all hands on this coast tract have been in the first months of the year fully employed in the herring fishery. As this fishery seems at present to be on the decline, it may be that the inhabitants of the coast will find their compensation in the cod-fishery. Hitherto however the cod-fishery has given a very insignificant yield, which has been attributed partly to the want of fresh herrings for bait during the time while the cod was on the banks spawning. Nets have been very little used in this tract.

However it is not only during the spawning time and the pursuit of the capelin that the cod-fish visit the Norwegian coast, but also throughout the whole year. Thus for instance, there are sold every year from east Finmark about 20000 barrels fresh or salt cod taken tn the summer, to Russian vessels (lodje) from the provinces of the White Sea, or exchanged for rye flour, hemp, cordage &c.; also large quantities of fish are dried. The same traffic takes place on the coasts of the provinces of Tromsø and Nordland. Also

The fishery of several other sorts of Gadus

is of great importance for Norway.

Among these the coal-fish (Gadus carbonarius, Gadus virens) takes the first place. This fish appears along the whole coast of Norway under different names. Especially it formerly visited the coast between 60—62 degrees of N. latitude, from the month of December to March, in order to pursue the winter herrings.

In the summer and in the autumn, large quantities are taken along the coast of Nordland and Finmark.

The coal-fish are taken as well in nets as with set- and hand-lines; the latter are not always furnished with sinkers, but are dragged after the boats which are rowed. In Finmark the fish are often found in such dense masses that only a large hook fastened to a staff 2—3 metres long is required to take them.

Here, as on the coast of Søndmøre, the most important implements are however the sweep nets and the fluke nets, which are stretched over the banks and taken up by four boats when the fish pass over.

With exception of 30—40000 barrels which the Russians salt in Finmark on board of their ships, all the coal-fish destined for exportation are dried as «Rødskjær». Unfortunately the fish hung up to dry late in the autumn is much exposed to be frozen and thus to lose all value as food.

It has therefore been attempted to prepare the coal-fish also as rock-fish; but no great markets have been found for it.

Of dried coal-fish there is exported yearly a quantity of 2—3 millions Kilogrammes. The liver yields a very good oil, which is however not so highly esteemed as that of the cod-liver. The roe is not much prized by the French fishermen as bait in the Sardine-fishery; as the ova do not easily separate in the water, but cling together in larger lumps, which stick to the nets and stop up the meshes.

After the coal-fish, we have to mention the ling (lota molva) which is found along the coast from Bergen to the Russian frontier. This fish does not appear in great shoals like the cod- and coal-fish, but it exists in quite sufficient quantities not only to contribute largely to the nourishment of the population, but also to yield valuable export products. The fishing in the summer on the large banks which lie far out in the sea, is usually especially productive; and it is therefore sometimes worth while to sail 6 or 8 miles thither in order to carry on the fishery.

Another species of ling, Gadus abyssorum, appears sometimes in great numbers in the fjords of the provinces of Bergen and Romsdal and gives occasion for a very profitable catch.

Together with the ling, we usually find on the banks and on the coast, the tusk (Brosmius vulgaris Cuv.) which is likewise taken in considerable quantities.

This fish, like the ling, is not only eaten fresh in great quantities in the country, or sent away packed in ice, but it is also prepared as rock-fish and Rødskjær. The tusk is also sometimes dried as stock-fish.

The liver of these species furnishes a very fine oil, which is however less fluid than the cod oil. The roe has about the same value as that of the cod.

The take of haddock (Gadus æglefimus Lin) is of considerable importance, since markets have been found for this fish salted or dried, in Spain, Holland and Italy. The haddock has also a great importance for the nourishment of the country, as it appears in great masses along the coast and is usually extremely cheap.

Only the provinces of Nordland, Finmark and Romsdal furnish haddock for export, prepared partly as stock-fish, partly as rock-fish. The liver gives a very fine oil.

The capture of the following species contributes also in a great degree to the nourishment of the country: the Gadus pollachius, L. Merlangus vulgaris Cuv. Sebastes Norwegicus Cuv. of the lip-fish (Labrus maculatus and Labrus mixtus), of the wolf-fish (Anarrhicas lupus), of the flat-fishes (Pleuronectes microcephalus, Pleuronectes hirtus and Hippoglossus vulgaris). Moreover there are considerable quantities of halibut sold by the fishermen of Nordland and Finmark to the Russians, who salt them on board; and several shipments of the fresh fish packed in ice, go to Great Britain and France.

The nets which are used in the cod-fishery in Norway, are usually made of hemp-yarn of 2—3 or 4 strands, more rarely of flax or cotton yarn. The hempen thread is mostly spun by the families of the fishermen on the spinning-wheel; the supplement is furnished by the factories in Bergen and Christiania and also by those of Great Britain and France. The netting is executed exclusively by the fishermen themselves, their wives and their children.

In the poorest districts of the neighborhood of Bergen, the inhabitants make the hemp-thread spinning and the netting their home industry, which however is far from being remunerative; for even the most diligent and skilful workmen can scarcely earn more than 12—15 cents daily. Nevertheless this work is of great use to them in the winter evenings, when they would otherwise have too little to do; and their children can also take part in it.

The cotton and flax yarn is supplied by the Norwegian and English manufactories.

The cordage for the nets, as well as for the set-lines and hand-lines and their snoods, is mostly supplied from the rope manufactories of the towns, especially Bergen; but many of the finer lines are prepared on the spinning-wheel in the fishermens' houses.

The hooks, which are made almost exclusively of tinned steel or iron, come partly from England and partly from the Norwegian towns.

Preparation of the produce of the cod-fishery.

We have previously mentioned that as soon as the cod-fish are cleaned and the heads taken off, they are mostly hung up to be dried as stock-fish. This is performed by tying two fish together by the tails with a thin string and hanging them over a bar placed horisontally on a sort of gallows. Here the cod in Lofoten remains exposed to the air until the 12 June, when it is usually sufficiently dry to keep for years; and then it is brought into the towns, especially to Bergen which is the chief storing place. As the visiting fishermen leave Lofoten in the middle of April, the fish remains some months under no one's immediate care; but an arrangement is frequently made with some one or other of the nearest neighbors, that he shall take care to hang up again all the fish which the wind or the birds of prey may throw down; and for this he usually gets 60 cents from each boat. In Finmark, where the catch ceases later, the drying is not terminated before the month of July; and it is also there much more difficult than in Lofoten; because the air in summer is often damp and foggy.

Part of the emptied and beheaded fish is sold to the rock-fish salters. These have either their warehouse on the coast, or they are masters of small vessels of 40—60 tons which come from all the towns of the west coast of Norway, even as far as Stavanger, 800—1000 in number, in the months of January, February and March, to Lofoten and Finmark in order to buy fish. In these vessels the cod is salted and stowed loose in the hold in the following manner. As soon as the fisherman has delivered the fish, it is cut open on deck down to the tail, so that it is quite flat. Then the back-bone is cut out to the third joint below the navel (porus anulus) and the fish is put into the hold in layers and sufficiently salted.

For salting the rock-fish they use chiefly the grey sea-salt from the west of France (Croisic, Vannes, St. Martin) the white salt from Aveiro and Figuera in Portugal, from Cadix and from Liverpool.

In the same manner the rock-fish is prepared in the warehouses on the coast.

As the air in Lofoten and in Finmark is too cold in the winter and too moist in the spring for the satisfactory drying of the salt fish, the ships, as soon as they are loaded, carry their cargo to the interior fjords of the province of Nordland, where the weather is usually more favorable for drying. Here the fish is landed, carefully washed and spread out on the bare rocks as soon as the snow has disappeared. Every evening it is put into large heaps in order to press out the water. With uninterrupted dry weather, 10—12 days suffice to get the fish ready for shipment; but the heat must not be too strong, nor must the rays of the sun act directly on the fish spread out to dry. In both cases the fish would be spoiled.

Now the rock-fish is shipped again in order to be conveyed to the towns, Bergen, Aalesund, Christiansund and Throndhjem, where the vessels usually arrive in the middle of June.

Some of the salters take the trouble to wash the cod before salting, whereby the rock-fish acquires a finer appearance and a better flavor.

On the tract of coast between the Throndhjemfjord and cape Stat, the winter terminates earlier than further towards the north; and in this tract the washing and drying of the fish is begun already at the end of April.

The rock-fish from Søndmøre is accordingly ready for exportation abroad in the latter half of the month of May.

The cold dry winds which usually prevail in February and March in Lofoten, and which render possible the drying of stock-fish, cease towards the middle of April; and the law accordingly prescribes, that all fish taken after the 14·April and intended to be dried without being salted, shall be prepared as Rødskjær.

To this end the cod is split in its whole length, so that the two halves only hang together by the tail. The back-bone is taken out in the same manner as in the rock-fish, and the fish is then hung up to dry with the stock-fish. As the flesh is directly exposed to the action of the air, it soon dries and becomes as hard as wood. In the same manner all the fish of the cod kind caught in the summer and autumn, such as the coal-fish and the tusk, are dried when they are not meant to be prepared as rock-fish. In the autumn they dry also the small cod-fish caught in the fjords as stock-fish under the name of Titling.

In Finmark part of the cod-fish, namely those destined to be dried for the Russian market, are split so that both halves are not only connected by the tail but also by the gills; these are called Russian fish.

In the later years they have begun to send the cod-fish direct to Great Britain, and especially to Scotland, but not in large quantities.

As soon as the cod is emptied, they proceed to salt the roes. These are put in layers into barrels that are perforated with holes to let out the pickle; between each layer, salt is strewn; a quarter of a barrel salt for each barrel of roe, preferably of the same sorts as are employed in salting the rock fish. As soon as the barrel is full, it is closed, but it is filled again when sent to the towns.

The liver, which is destined to be used in the preparation of medical oil by steam, is immediately carefully washed, dried and strictly sorted, to exclude any with the gall adhering to it, and finally placed in a large pot of tinned sheet iron. These tinned pots stand in larger pots; and in the interval between the outer and inner pot, steam is introduced from a boiler; whereupon the livers immediately begin to give out the oil. Some manufacturers let the steam act directly on the liver; others fill the intervals between the pots with warm water, maintaining that the temperature of the water can be regulated more easily than that of steam.

As the oil is given out, it is taken from the pots with large spoons and filtered when cold three or four times through filtering paper, after which the oil is ready for filling the tin cans or the oak barrels in which it is forwarded to the market.

Those parts of the liver which cannot be dissolved by steam or warm water, are boiled in large cast-iron pots, until they yield a dark brown or dark green oil which, as is well known, is used in large quantities for tanning.

After this, there still remains a coal-like substance which afford a good manure.

The fishermen who prepare their oil themselves, put the livers immediately into barrels or casks, in which the liver gradually dissolves by itself, and confine themselves to removing the oil as it is given off. The first oil formed — if the livers were fresh and clean — has nearly no smell nor taste, and is used as medicine under the appellation of natural or ordinary medicinal oil. The color is straw-yellow.

The oil subsequently formed has a somewhat darker color, like that of clear Madeira wine, and is called ordinary bright or only bright oil; the third yield, which is somewhat redder, is called bright brown, and is also often used in medicine, although this sort is rarely found to have a good taste.

That part of the liver which does not dissolve of itself, is boiled by the fishermen to brown or tanner's oil.

The red sorts of oil, as also the tanner's oil, are usually conveyed in oak casks; but when the yield is very great, it is frequently necessary, especially in Finmark, to employ deal barrels.

As previously mentioned, the back-bones and heads of the various sorts of cod-fish, are employed as well for the manufacture of guano as for cattle-fodder. Also the tongues and the swimming bladders are kept, partly for eating, partly to be employed in the manufacture of fish-glue.

Traffic with the produce of the Cŏd-fisheries.

As soon as the Nordland fisherman is returned from Lofoten, and has got his oil ready for shipment, he sends it with the roe and the produce of the previous autumn fishery, in large vessels (Jægter) of 80—120 tons to Bergen, where the vessels usually arrive in the latter part of May. This collection of vessels is called first meeting (fair).

Here all the products are delivered to the merchants who in the previous summer have supplied the fishermen with money, implements and provisions, and mostly at prices which leave to the merchant a decent profit, as indemnity for his risk and loss of interest, when he resells to the exporters. Those fishermen who require no advance, sell their produce to the highest bidder. As soon as the products come into the merchants' warehouse, they are sorted by workmen, according to their quality, for the different markets.

Of cod-liver oil there are, as previously mentioned, five qualities: Steam-boiled medicinal, ordinary medicinal, ordinary bright, brown bright and brown or tanners' oil. The same sorts of oil, excepting the steam-boiled medicinal, are also procured from the livers of coal-fish, ling, tusk and haddock; they are also frequently mixed with similar qualities of cod-liver oil. In selling the oil to the exporters, every barrel is examined by an official expert, who, with an iron instrument, makes a mark close to the bung, indicating each different quality, and at the same time thereby certifies that the cask holds the legal measure (116—117 litres). The chief markets for the Norwegian oils are Germany, Holland, Belgium, Great Britain, France and Italy.

The roe destined for exportation is sorted by the purchaser under the inspection of the official expert, put into new perforated barrels with a new layer of salt between each layer of roe. The ferm, well-salted roes only are accepted as of first quality, and the soft roes are classed as of second or third quality. The roe is soft shortly before and after the brooding (Ausbrütung). After the barrels are filled, they remain standing five days; the new salt dissolves during this time, and the roes are pressed together; the barrels are then closed and ready for sending to market. As previously remarked, the cod-roes are the most valuable. Roes of ling and tusk are worth about 10% less; those of coal-fish scarcely half as much as cod-roes. France buys more than $^{9}/_{10}$ of all the roes produced in Norway; and Spain the rest. In both countries they are used as bait for taking sardines.

The cod which are dried as stock-fish in the autumn (Titlinge), are divided into 4 classes: Autumn stock-fish of which each weighs about 800 grammes, Dutch Titlings of about 320 grammes, Bremen Titlings of about 170 grammes, and ordinary Titlings, the refuse of the three sorts before mentioned. The chief market for the Titlings is Holland, which takes also the greater part of the dried haddock and the round tusk; these haddock weigh about 200 grammes, and the tusk 320.

The Rödskjær cod are sorted as follows: Holland tender fish, of about 900 grammes, which are sold chiefly in Sweden, Denmark and Holland, Wæcker-fish, of 530 grammes, for Denmark, Holland and Italy, Høker-fish, of 210 grammes, destined for Germany and Holland and Winther-Rödskjær, which are dried late in the autumn and in the winter and not unfrequently frozen; this last goes with the refuse of the other sorts chiefly to Sweden, Denmark and Italy.

The ling dried as Rødskjær are distinguished as: bright ling, which are almost transparent and weigh 1—2 kilogrammes; the great tender ling of about 2 kilos, the small tender ling of about 1200 grammes, and the ordinary or refuse of the other qualities. The bright ling go exclusively to Holland; the tender ling, to Holland, Sweden and Italy. Both the latter countries are also the chief markets for the ordinary ling (screw-ling).

The dried coal-fish is sorted according to size: large of 900 grammes, middle of 530 grammes, and small of 300 grammes. This is consumed almost exclusively in Sweden and Finmark; occasionally some is sent to South Italy.

The Rødskjær Tusk goes under the names of bright and ordinary, weighing about 400 grammes, mostly to Holland.

The salted and dried tongues and swimming bladders, are mostly sold to Spain and the Island of Cuba.

In exporting Rødskjær, a piece of the tail and of the neck is usually cut off to facilitate stowing in the ships' hold; and in exporting stock-fish, also a piece of the gills.

The pieces of fish thus cut off are eaten in the country; the tails are used as manure.

A few years ago a manufacturer in Lofoten began to make flour of stockfish. Although this flour is represented as being very nourishing, it has hitherto not found much favor here in this country; as we have already a superfluity of fresh fish.

Fish-guano is chiefly exported to Germany.

As already mentioned, the rock-fish which is prepared on the coast of Søndmøre, is usually ready for shipment in the latter half of the month of May, and is brought to the town of Aalesund, where usually several steam- and sailing vessels are waiting for the first arrivals, in order to convey this merchandise to Spain and Portugal. At the same time the fishermen and salters who dwell south of cape Stat, bring their products to Bergen; somewhat later those of Romsdal and Nordmør bring theirs to Molde and Christiansund, the chief market for this article.

In June and July, as soon as the drying is ended, the rock-fish are shipped from Lofoten and Finmark to Throndhjem, Christiansund, Aalesund and Bergen, and in these places mostly sold direct to the exporters, who get rid of them in Spain, Portugal, Italy, Great Britain, Cuba, Brazil and La Plata.

The rock-fish destined for the European markets, are placed in layers in the holds of the steam-or sailing-vessels which effect the transport; but those intended for the transatlantic countries are pressed and packed in tight wooden cases, sometimes even in air-tight soldered tin cases. In tin cases the fish will keop for 2 or 3 years, if it was properly dry when packed. The weight of cod rock-fish is from 800—1200 grammes each fish.

The ling, tusk and haddock which during the summer are prepared as rock-fish, have likewise their chief market in Spain. Scotland also has during the last years taken considerable quantities of these sorts. The weight of ling rock-fish is 1½—3 Kilos; that of the tusk, 1 Kilo; and that of the haddock about 400 grammes each.

After the 12 June the Nordland fishermen begin to tako down the stock-fish and Rødskjær hung up to dry in Lofoten and to ship them together with the roe and oil which were not sent off at the first meeting (fair) to the towns in cutters (Jægter) especially to Bergen. The greater number of these vessels arrive at the end of July or the beginning of August for the second meeting, where usually a number of ships are waiting to couvey the new stock-fish immediately to Holland. Belgium and Italy.

France and Spain take also great quantities of these sorts of fish.

In Bergen the stock-fish is classified in the following sorts: the great Lob weighing nearly 2 Kilos each; Bremen round fish, about 1200 grammes; Holland round fish, 6—700 grammes, and the Italian or mixed round fish of about 900 grammes. The Bremen and Holland round fish goes in great quantities to Holland, Belgium. Germany and Italy; Italy is nearly the only market for the mixed; and the refuse also find buyers there.

The Roundfish, as also the Rødskjær, can be kept very long and in all climates if it is well dried. It is sent even to China loose in the ships' hold; but the export to that distant country does not exceed one or two cargoes yeariy.

The round-fish (stock-fish) dried in Finmark is sent almost exclusively from the towns of Tromsø, Hammerfest, Vardø and Vadsø, and chiefly to the Mediterranean.

We refor our readers for information as to the export of the products of the cod-fisheries, to the accompanying tables for the years 1868 to 1874.

Before we conclude our observations on the cod-fisheries, we. must notice one branch which a few years ago promised to furnish a rich source of income; but it has since developed itself only in a slight degree, because the outfit is too costly: we mean the capture of cod, ling and tusk on the most distant banks in the open sea. This fishery is carried on chiefly in the summer months between the 60th and 63rd degree of latitude at a distance of 10—12 miles from shore by decked vessels of 40—60 tons with crews of 10—12 men, whose home is Aalesund and the environs. Each vessel is furnished with 70—80 set-lines with 60 hooks.

In order to protect the bait from the insects found on the banks and to make it more conspicuous for the fish than if it rested on the bottom, the snoods are furnished, 3—4 inches above the baits, with small floats of hollow glass or wood, whereby the extremity of the snood next the hook is kept hanging perpendicularly in the water. Tho lines are rowed out and set on the bank at a depth of 150—200 fathoms, by means of two boats 20 feet long.

The weekly catch of each vessel rarely exceeds 2000 fish, among which are also halibut and scate (Raia batis) the latter are not used in Norway. The fish are emptied on board, and every 5 or 6 days brought to land in order to sell the bodies, the livers and the roes. The cod, ling and tusk are here prepared as rock-fish: the halibuts salted in barrels for the consumption of the country.

Of the scate only the liver is used: it produces a good tanner's oil.

The herring fishery is of nearly as great importance for the economy of Norway as the cod-fishery. According to the history of the country, the herring-fishery waa carried on as early as in the 9th century, and has always been reckoned as one of the most important sources of revenue.

Among the herring fisheries, that of the

Winter herring (Spring herring)

has hitherto up to the latest time held the first place, although it has several times been interrupted. Thus for instance we know from the annals of Norway that in the first half of the 16th century the fishery of winter herrings took place on a large scale in the neighborhood of Bergen, while towards 1567 the fish avoided these coasts.

It is supposed that the herrings were again there in the 17th century: but it is known that from 1650 to 1654 there was no fishery.

In all probability the fishery did not recommence before 1699 or 1700, and from this time it was prosecuted uninterruptedly until 1784, although with extremely variable results. In the year 1784 the herrings again deserted the coast, and did not reappear until 1808. From this year to 1870, the winter herrings have constantly visited the coast in great masses; yet a remarkable decrease was noted in the last named year, and this decrease became more and more considerable during the subsequent four years, until in 1875 and 1876 the fishery was entirely abandoned.

This disappearance and return of the winter herrings has giwen rise to various Hypotheses and theories concerning the migration of the herrings.

Some learned naturalists are of opinion that the winter herrings only visit the Norwegian coast periodically at more or less regular intervals. Others maintain on the contrary, that the herrings never leave the coast, but that they do not always come in among the rocks and in the fjords or seek the shallow water, and that it is only the fault of imperfect or deficient implements that the herrings connot be taken in the deep and distant waters. One thing is however certain, that in the last 20—30 years, a considerable diminution in the size of the winter herrings has been remarked, as also that during the last few years before the fishery ceased, the herrings have only come to the coast immediately before, or even after spawning.

The ordinary spawning-grounds of the winter herrings are found on the tract of coast from cape Lindesnæs to cape Stat from the 58th to the 62nd degree of latitude. The fish has seldom appeared on the east side of cape Lindesnæs; but in the years 1736—1755 an important fishery took place in the Moldefjord and even in the neighborhood of Christiansund. Also in later years large shoals of herrings have visited the coast between cape Stat and the Moldefjord. From 1808 to 1835 the herrings spawned chiefly in the neighborhood of Bergen, subsequently leaving these coasts and appearing there but rarely in the last few years. From 1830—1839 the herrings in great masses visited the coasts between Flekkefjord and Farsund; in 1840 the coasts of Egersund; subsequently they have not appeared again south of Jæderen.

In the following 30 years the most important spawning-places were between Skudesnæsfjord and Selbofjord to the south, and between Fensfjord and the Island of Bremanger to the north of Bergen. From 1870 to 1873 the principal take was between 61° 40 and 62° 30'.

The last half of the month of January is the time when the herrings usually approached the coast to spawn.

But even some weeks earlier, various signs are observed which indicate that the herrings have quitted their (probably) usual abode in the great deeps near the coast. Such predictory phenomena are: the appearance of a number of whales (Balænoptera rostrata, Fabr., Sibbaldus laticeps, Gray) which feed on the herrings, also innumerable hosts of gulls (Larus argentatus

Lestris parasitus) which hover over the shoals of herrings ready to pounce on them as soon as they rise to the surface of the water.

Another sort of herring which bears the name of sun-head or ray-herring, and which, according to the popular belief, lives in the immediate neighborhood of the coast in those basins through which the winter herrings must travel in their wandering towards the coast, used to rise towards the surface at the same time; and smaller quantities of this sort were generally taken in those tracts which were shortly after visited by the winter herrings

Moreover the stomachs of the cod and coal fish which at this time are taken off the exterior coast, were found filled with herrings.

The shoals of herrings which selected the coasts south of Bergen for their spawning place, usually moved from south to north, from Skudesnæsfjord to Selbofjord as well along the outside of the islands as between them. The shoals which had their spawning ground to the north of Bergen, moved on the contrary from north to south from Bremanger to Fensfjord; others touched somewhat later at the environs of cape Stat and the coasts of Søndmør. The fishermen pursued them uninterruptedly, and on account of the incalculable and rapid progress of the fish could not establish themselves permanently anywhere; they followed the herrings until they had quite left the coast.

The inhabitants of the long tract of coast from cape Lindesnæs to the mouth of the Moldefjord, used to take part in the winter herring fishery. Those who live to the south of Jæderen had of course a very long and dangerous voyage to Bremanger, and were obliged to leave home about the end of December.

These fishermen were the most skilful and enduring of all those in southern Norway, and their labors have always borne the richest fruits.

Their open boats, which are essentially different in form and rig from those used in the northern provinces of the country, were 28—30 feet long with a breadth of 9—10 feet and a length of 3¼—4 feet. Instead of the square sail of the Nordland boats, they carried a gaff or spritsail with foresail and jib, and are more adapted for sailing than for rowing, although furnished with oars. North of Bergen there are however boats which are tolerably like the Nordland boats in form and only carry one sail; but these are disappearing little by little.

In consequence of the irregular appearance of the shoals of herrings in the different fishing places, only a few dwellings for the fishermen had been erected there.

The fishermen had to provide themselves otherwise with shelter in the following manner:

Four or five boats'-crews hired a small decked vessel of 20 to 30 lasts; had beds put up in the hold, and shipped also their provisions and the necessary clothing. These vessels accompanied the shoals of herrings, and served as warehouses and dwellings for the fishermen.

Their equipment in regard to provisions was far from being so complete as that of the Nordland fishers who go to Lofoten; but as they passed many towns on the way, they had good opportunity to supply themselves from time to time.

Most of the fishermen from the south west of Norway went from their homes direct to Bremanger or Batalden (62°) where the fishery during the last 10 years used to begin; the others remained on the south side of the Island of Karmøen (59° 10′). In the middle of January, the inhabitants of the neighboring coast tracts assembled also in the same places; and by the 20 January most of the fishermen were at their stations.

The boat used in the winter herring fishery had usually a crew of 4—5 men and was furnished with 20—60 nets, each of 10—15 fathoms long and 100—120 meshes deep. The size of the meshes varied between 28 and 35 millimetres between the knots. The nets were nearly all of hemp-yarn single, double or triple, and tanned with birch- or oakbark, sometimes also with oxide of copper or zinc. There were also some cotton nets.

Cork was used exclusively for floats. Stones, which can be had any where, served instead of lead sinkers.

As soon as it appeared that the herrings were on the move towards the shore, the boldest fishermen went out to sea, frequently one or two miles, and set their nets as a trial. If the trials succeeded, the whole fleet of fishermen followed after.

The nets were set also here in the evening and taken up on the following morning. If the herring-shoals were close to the shore and tolerably dense, the fishing went on also during the day. Each boat set out usually 12—16 nets at once, in sets of 3—4 nets. Sometimes one setting would produce enough to fill the boat entirely, and in this case the boat would return, as soon as the cargo was discharged, to take up the other nets which had been left out. On the average, a yield of 1000 herrings for each net was considered a very good one.

Some of the fishermen set their nets on the bottom at a depth of 20—30 fathoms, sometimes even 50 fathoms; others on the contrary, at the surface.

Accordingly as the masses of herrings go higher or lower in the water, the best results are obtained by the former or the latter method.

But the herrings are not only taken with the nets above mentioned. When the herrings penetrate into the fjords, they are frequently taken in great quantities by means of sweep-nets.

The outfit for this latter sort of herring-fishery consisted of a large net 100—150 fathoms long and 20—30 fathoms deep; a middle net 80—100 fathoms long by 15—20 fathoms deep, and a small one 35—40 fathoms long, 8—10 fathoms deep. For each of these nets, with tackle, buoys, anchors and covering, a large boat was required and a couple of smaller boats, also usually a lodging vessel for the crew of 20—25 persons. The cost of the nets with the boats may be estimated at 4—5000 Austrian florins. Such an outfit is called «Notebrug» (net-stock) and the foreman is called «Notebas» (net-master).

The sweep-nets are used in the following manner: As soon as the shoals of herrings (whether for the purpose of spawning, or chased by whales or coal-fish) come into a narrow bay in which the water is not too deep, one end of the large net is made fast on the shore on one side of the mouth of the bay or as near to it as the length of the net will allow, and the other end is immediately drawn over to the other side by means of the boat, and fixed there so as to form a wall. If the herring shoal is near to a coast which does not form a bay, the large net is rowed out in a semicircle. Usually the enclosed shoals of herrings press against the net in order to break through; and it is necessary to be always on the watch to drive them away, which is done by continually letting down and drawing up white boards along tho inside of the net. As soon as the herrings are enclosed, the small net is thrown out, and the fish are drawn by it close to the shore, where they are taken out. with bag-nets.

The fishery with sweep-nets was often very profitable, but extremely uncertain. For several years the herrings did not come so near the coast that they could be enclosed. Uneven bottoms, strong currents and storms are unfavorable to this fishery, as they allow the herrings to find a way to escape, or force the fishermen to take up the nets before the fish can be secured.

The herring fisheries north and south of Bergen, were almost always independent of each other; and, taking place almost at the same time, they were carried on by different fishermen.

As the fishery between Bremanger and Fensfjord ceased a few weeks sooner than the southern fishery, the fishermen who dwelled south of Bergen were able on their return home to take part also in the southern fishery, while those who dwelled in the north followed the herrings to Nordfjord in the neighborhood of cape Stat.

The richest fishing-places were, in the years fifty to sixty, Kinn in the north, and Sletten with Bömmelfjord in the southern district.

Here, on a fine day in February, the winter-herring-fishery might be viewed in its brightest aspect. The sea in an area of a square mile covered with 1000—1500 boats. Thousands occupied in taking up the nets and in bringing the herrings on shore; hundreds of small vessels conveying the fresh fish from the landing places of the fishing boats to the neighboring salting houses. Further out at sea appear the foaming water — spouts of a number of whales — large thick flocks of gulls, which sometimes threaten even to obscure the sun, fill the horison. But unfortunately such days were rare; for storms with rain and snow predominate in these waters; so that frequently many days passed without the fisherman being able to go to sea at all; and the nets, set out in thousands, drifted out into the open sea never again to be found. These rich fields are now desolate.

The number of boats which took part in the winter-herring-fishery, was at that time estimated at about 6000 with crews amounting to 30000 man.

According to a census there were in the year

1854 in the south fishery district 3749 boats with crews amounting to 15,311 men, and in the northern district 1261 boats with 5596 men fishing with ordinary nets.

besides 316 outfits (Notelag) for sweep-net fishing, with a total staff of 6628 men occupied in the south; as also 24 outfits with 455 men in the northern district.

In the year 1860 the numbers in the northern district had risen to 2632 boats with 12781 fishermen with ordinary nets.

To the north of cape Stat, there were fishing in the year 1865, bosides the above, 296 boats with 1881 and moreover 6 net-gangs with 61 men.

Besides the crews of the transport vessels, the work-people of both sexes occupied in preparing the herrings, and the coopers — the winter-herring-fishery formerly employed at least 50,000 individuals.

But even in 1871 we remark a decrease to:

2003 boats with total crew of 8567 men in the south
and 1003 boats with total crew of 7046 men in the north
besides 117 net-gangs with total crew of 3189 men in the south
10 net gangs with total crew of 234 men in the northern

fishing district. Subsequently these figures have been further reduced each year until 1875, when the expedition ceased almost entirely.

The produce of the winter-herring-fishery varied in previous years generally between 6 and 800,000 barrels, of which about 50,000 barrels were consumed, fresh or salted, in the country and the remainder exported.

During the last five years, the yield has considerably decreased: in 1873 it scarcely amounted to 70,000 barrels and in 1874 not even 20,000 barrels.

The average price of the fresh herrings during the last ten years may be estimated at 2 Doll. 50 Cts. per barrel of about 150 litres.

The profit of the individual fishermen was naturally very variable. It depended partly on their getting in proper time to the fishing places where the herrings flocked in great masses; the price of the fresh herrings had also a great influence; the courage and skill of the fishers were moreover of considerable importance. The fishermen belonging to the coast between Egersund and Christiansand seldom returned with a smaller yield than 5—600 dollars for each boat. Most of the fishermen who engage in winter-herring-fishery are fitted out for their own account, and own their boats and nets. Those few who take hire, usually receive half of the yield, while the remainder belongs to the owner of the boat and implements; sometimes however they receive only one fourth of the yield and Doll. 1. 22—Doll. 1. 50 weekly.

The sweep-net-stocks on the contrary are owned either by the merchants of the towns, or by the more wealthy fishermen of the coast district, of whom many take themselves the command of their own expeditions in the capacity of «Notebas« (foreman). The hired crews receive for their labor either the half of the yield, or a smaller part with a weekly salary besides lodging, firing and light. The «Notebas« receives a portion of the yield twice as great as that of each other man of the crew.

It is nearly impossible to estimate the gains of the sweep-net-fishers; for sometimes a whole season may pass without a sweep-net-stock taking a single herring, while at other times the take may be enormous. A yield of 40—50 Doll. per man was considered satisfactory. But the work of the sweep-net fisher is not nearly so laborious and dangerous as that of tho ordinary net fisher.

In the month of December 1869, immense masses of herrings of a somewhat smaller sort and moreover without milt or roe came to the coast in the vicinity of Bergen. No preparations had been made for receiving them; the merchants of the town hesitated to purchase this fish on a large scale, having no suitable market for them; and thus only about 150,000 barrels were taken, almost exclusively with sweep-nets. The quantities of these that were exported are noted in our tables as Ylen herrings. Subsequently also smaller shoals of these herrings appeared in the month of December and January, but the take of them was of small importance.

On the other hand it seemed that Norway would obtain for the great deficiency in the take of winter-herrings a rich indemnity in the fishery of The large northern herrings.

The oldest inhabitants of the provinces of Nordland and Finmark have often mentioned that in their youth, shoals of very large and fat herrings had appeared along their coasts, without any important catch of them having ever been in question, which seems natural, on account of the scanty population and deficient implements in the previous century.

In the first years 60—65 there appeared in the months of September and October large shoals of very large and fat herrings with traces of nascent roe and milt, on the coast of Vesteraalen (69°). No preparations had been made for them; as it was assumed that these shoals had only approached the shores casually, having their abiding place elsewhere. But in the following years the herrings appeared regularly in Vesteraalen, approaching the main land in the month of November; and now the outfits were organised on so large a scale that in 1866 200,000 barrels were taken. Subsequently the herrings have visited the coast every year until 1874, the first shoals having usually touched on the west side of Andøen passing afterwards into the large Andefjord and into the various bays formed by it, and others again passing the south point of the Lofoten group, taking their course towards the shore of Salten between 67°—68°.

In November and December, the herrings appeared somewhat more to the south, between 65° and 66° and even down to the 63rd degree of latitude some shoals have been observed. The larger the herrings are on the coast, and the further the season advances, the more the milt and roe are developed, but the more also the fish loses in fatness. By the middle of January the herrings had usually left the coast. The spawning places of these herrings have not yet been discovered; but cod-fish caught in the beginning of January between the 65th and 66th degeee of latitude, have been found full of herring spawn.

Does the appearance of these northern herrings stand in any connexion with the disappearance of the winter-herrings? And what are the causes of this appearance? Here is a great problem for the naturalist to solve.

And just as great and just as difficult a problem is propounded by the new phenomenon, that the large herrings — without any predictory symptoms or indications having been observable — suddenly disappeared in 1875 in which year there had been perhaps greater preparations made for taking them than in any previous year; and that on the other hand in the beginning of December, after an abundant summer-herring-fishery, between the 64th and 65th degree of latitude, there appeared off the coast in the same district enormous shoals of a smaller sort of herrings with rather well developed roe and milt; and that smaller shoals of the same sort shewed themselves in March 1876 in the neighborhood of Bergen (60°) and shed their roe and milt.

The fishermen did not think about solving this problem so long as the large herrings were present, but only endeavored to take advantage of the new supply; and not only did they flock in thousands from all the coast districts of Nordland, which were then sufficiently provided with implements, to the fishing places, but there came also hundreds of sweep-net associations from the south of Norway to the north in spite of the distance, in order to rob the sea of its treasures. In 1871 more than 20,000 men took part in the north-herring fishery, and the produce of their labor reached nearly to 700,000 barrels.

In the 3 following years the fishery was less productive.

The north-herring-fishery was carried an partly with ordinary nets and the boats built for cod-fishing, and partly with sweep-nets.

The sweep-nets have in the last years supplied the greater quantity, as the herrings penetrated into the bays almost everywhere. Many of the sweep-net associations have therefore, in spite of the low price at which the fresh herrings often had to be sold, done a brilliant business.

But the life of the fisherman was, especially in the first years of the fishery, during which no preparations were made anywhere for a great concourse of people, a very sad life; for there was seldom a shelter to be had during the night. Subsequently a great improvement took place in this respect; for at all fishing stations there have been large dwelling houses erected for the fishermen; and many of them can also find shelter on board of the numerous vessels which salt the herrings.

Preparation of the Winter-herrings and North-herrings.

As soon as the herring-fisher comes to land with his cargo, he immediately sells the herrings to the salting houses which in nearly all the fishing places are constructed by the merchants of the towns or coast-districts, or to owners of the vessels which accompany the fishermen either for the purpose of salting the fresh herrings on board or conveying them to the towns.

The number of such vessels in the winter-herring-fishery was over 800 and in the north-herring fishery still greater. The winter-herrings were formerly sold by the 480 fish: but since the fishermen have begun to make the meshes of their nets smaller, the salters have agreed to buy by the barrel of about 150 litres. But the herrings taken in sweep-nets are never counted; they are reckoned according to the number of barrels salted.

As soon as the herrings are in the salting houses or on board of the salting vessels, they are emptied, and immediately placed in the barrels in layers with sufficient salt strewed between each layer. The next day when the salt has already begun to dissolve, the barrel is closed, and the empty space filled with pickle. Then the herrings are stored for export. When the take is abundant, it is necessary, especially in the North, where labor is scarce, to salt the herrings without emptying them. In such cases, the herrings are either afterwards, when time permits, emptied and resalted, or sometimes also shipped uncleaned.

In the town of Bergen there exists a large establishment for smoking the winter- and north-herrings.

For salting the herrings they chiefly use the white sea salt from Lisbon, St. Uebes, Trapani, Cagliari, taking $\frac{1}{4}$ to $\frac{1}{5}$ barrel of salt to each barrel of herrings.

The herring barrels are made of fir, beech or birch wood, and hold 116 to 117 litres.

Trade in Winter- and North-herrings.

Many of the salters of winter-herrings, as well in the towns as in the coast districts, used to send their herrings for their own account to the Baltic or to Sweden.

But also many herrings were bought in the towns for foreign account and exported.

These were carefully examined by the public expert, to see that none were bad or damaged, and stamped by him; then nearly all the pickle was taken away, and the barrels filled with herrings and closed, after a few handfuls of salt having been put at each end. The remaining empty space (if any) was then filled up with pickle; and the merchandise was ready for shipment.

One barrel of such winter-herrings contained 500 to 550 fish 30—32 centimetres long. Among the herrings taken in sweep-nets there are some of smaller dimensions which were salted by themselves, and sold dearer or cheaper than the larger ones according to the demand.

The north-herrings were in the course of the autumn and winter conveyed to Throndhjem, Christiansund, Aalesund, Bergen, Haugesund or Stavanger, whence they were again shipped abroad, after the barrels had been inspected and refilled.

One barrel of north-herrings contained, when exported for foreign account, about 400 fishes about 35 centimetres long, weighing net 110 to 115 Kilos.

Of quite as great importance as the fisheries of the winter- and north herrings were, is the fishery of the

Summer-herring (fatherring).

As soon as the winter-herring fishery was over, that is to say in the month of April a smaller sort of herrings usually appears on the tract of coast between Bergen and Stavanger. At first they are very dry and not fleshy; but gradually they become fatter; and when with the warmth of summer the innumerable multitudes of Salpæ and Crustaceans, which inhabit the waters between the skerries and in the fjords, develop themselves, and the herrings consequently find abundance of food, the fish becomes very fat and delicate, the stomach being coated with fat. In June and July very fine herrings are to be had; but their fat is very soft, dissolves easily in warm weather and gives a rancid taste to the fish.

In July the summer-herrings are usually found somewhat more towards the north, in Søndfjord, Nordfjord, Romsdal and afterwards in Nordmør in the Throndhjem fjord, in the Namsen fjord also along the coast of the province of Nordland. and even up to Finmark.

The shoals of summer-herrings are very irregular; but no single year is known in which some tracts of the coast mentioned has not been visited by larger or smaller shoals of them. The herrings caught in August and September are most esteemed; for then not only is the flesh still very fat, but the lining fat is also firm and will keep well. Later in the autumn the lining fat decreases and is replaced by milt and roe. At the end of November this fishery usually ceases; but the herrings often remain even until January in several of the deeper fjords such as the Throndhjem fjord, Namsenfjord and Eidsfjord in Vesteraalen. But at this period the herrings are very thin and dry, and are chiefly used as bait for cod-fishing.

In the summer herrings, it was attempted to make a distinction between those which have their permanent abode in the great deeps of the fjords and among the skerries, approaching the surface at fixed times, and those which come from the sea; the latter were considered to be the finest and the fattest. But we must remark on this subject, that the latter sort scarcely ever appears alone, always mixing, on approaching the coast, with those which constantly inhabit the inner waters. Also there are found in the fat-herring shoals, expecially in the autumn, large herrings full of roe and milt, but with coarser, although fat flesh (slo-herrings).

In the summer, the fat herrings are taken exclusively by means of sweep-nets. In the autumn, when the nights are somewhat darker, the ordinary nets are used, as also floating nets of hemp, flax and cotton yarn of the finest sort. The breadth of these nets is 10 to 50 fathoms; their depth 200—250 meshes, the width of the meshes 23—27 millimetres between the knots. Each boat usually casts out at once 3 sets, each set consisting of 6 nets. For floats, cork is mostly used; but in the province of Nordland, oval glass floats are also employed.

The width of mesh of the sweep-nets for the summer-herring-fishery seldom exceeds 12 to 14 millimetres.

As the summer-herring fishery is chiefly carried on at that time when the inhabitants of the coast are occupied in housing their hay, potatoes and corn, and as the migrations of the fish are extremely irregular; the herrings are generally only pursued by the fishermen of those tracts which the herrings approach and by some few sweep-net associations. The summer-herrings seldom appear in so great masses as the winter and north herrings.

The fishery of the fat-herrings lasts 7 months, and takes place on a very long tract of coast. It is not possible for any one to fix exactly the produce; as enormous quantities are consumed in the country, on the one hand for food, and on the other hand for bait. On the average the yield may be 1,800,000 barrels annually, of which about two thirds are exported.

It is still more difficult to estimate the gain of the fishermen; as the price of these herrings according to size and quality is extremely variable in one and the same season.

Preparation of summer-herrings.

When the herrings are enclosed, they are allowed to remain undisturbed three days and nights inside the nets, in order that they may digest the Salpæ and Crustaceans with which they have been gorged; otherwise the salted fish would not keep well. In order that the herrings may not be exposed to the rays of the sun, they are not taken out of the water until towards evening. The blood which may have accumulated round the gills is immediately taken away, and the fish are put in layers into the barrels with $^1/_3$ or $^1/_4$ barrel salt from Lisbon, St. Uebes or Trapani well distributed between the layers in each barrel. At the same time the herrings are sorted according to their size in 4 qualities: merchants (K K) of about 250 millimetres, middle (K) of about 235 millimetres, large Christiania (MX) of about 200 millimetres, and small Christiania (CX) of about 180 millimetres long. As soon as the barrels are full, the empty space is filled up with pickle and they are then closed. The salting almost always takes place on shore and under cover, partly for account of the masters of the salting vessels, who mostly reside on the tract of coast from Nordland down to Stavanger and who follow the herring shoals by hundreds. The closed barrels are brought on board the vessels in order not to encumber the room in the small warehouses which the captains hire, and not to expose the barrels to a high temperature.

Trade in summer-herrings.

On the coast, the mixed fresh herrings are sold by the barrel of about 150 litres. In the towns, the sale measure is the barrel of salted herrings packed as they come from the vessels.

The purchaser fills the barrels in the manner which he prefers, usually rather lightly in the summer, when the flesh and the fat are soft, and tighter in the autumn and winter, when the herrings keep better. The two larger sorts have about the same value. MX is usually worth about 1 Dollar per barrel less than KK and K, and CX at most 1 Dollar less than MX.

For the Australian markets, which in the last years have taken great quantities of the smallest sorts, the heads of the herrings are cut off and entrails taken out.

The greater part of the summer-herrings is sent for account of Norwegian speculators to Prussia, Mecklenburg, Denmark, Sweden, Hamburg and Russia. Whatever is exported for foreign account is always controlled by a public expert and marked in the manner prescribed.

One barrel of summer-herrings packed for exportation contains about 800 merchants — 1000 middle — 1200—1400 large Christiania or small middle, and 1800 to 2000 small Christiania herrings; their net weight seldom exceeds 100 Kilos.

The fishery of another sort of Clupea namely

The Sprat (Clupea sprattus)

is also of great importance for the coast population of the provinces of Bergen and Stavanger, whose coasts this fish visits every year, appearing likewise on the Swedish coast in great masses. The sprats not only supply to a great part of the population of southern Norway an agreable and cheap food, but are also in some years exported abroad in quantities of up to 50,000 barrels salted. These little fish are only taken with sweep-nets.

In the spring the sprat is rather dry and not much esteemed, but towards the autumn it becomes very fat, and persons of fine taste prefer the sprat even to the best herrings.

The sprats are salted like the herrings with $\frac{1}{5}$ barrel white sea salt; but the salters do not take the trouble to place the fish in the barrel in layers; they only mix the fish up well with the salt.

The favorite anchovies are prepared from fresh sprats, with spices such as pimento, cloves, bay leaves etc. with salt and oil. The yearly take certainly exceeds 100,000 barrels; but this quantity might be easily increased, if foreign markets could be found; for the fish frequently appear in large masses. The chief export is to Hamburg, Denmark, Holland and Russia.

The anchovies, of which 40—50,000 kegs are exported yearly, go chiefly to Denmark and Hamburg.

The Mackerel fishery (scomber scombrus) is of still greater importance. The fish, according to the fishermen's opinion, inhabits the great depths of the sea, outside of the Norwegian coast from cape Stat to the Swedish frontier, and approaches the shore towards the end of May to spawn.

The fishermen however do not wait until the Mackerel come into the fjords; they seek the fish in the open sea even at a distance of 6 miles from shore, chiefly in the tract between cape Lindesnæs and the Selbofjord in the neighborhood of Bergen.

In this fishery they partly use lines without lead dragged after the boat, partly floating nets, partly stationary nets, sometimes also drag nets and sweep nets. In the autumn, the ordinary bait lines are also used. The boats fitted out for fishing with trolling lines are nearly all open, manned with 4—6 men of whom each manages two lines with two hooks. The bait is a small piece of red cloth. The lines are cast into the water all together and drawn after the boat, which is propelled by the wind or by the oars.

The mackerel is very greedy, rushes rapidly at the bait offered and is taken then in considerable quantities, even 2—3000 per boat in one night.

Usually however the floating nets give the best result. Until a few years ago, the same boats without deck which were used for the winter-herring fishery, were also used in the mackerel fishery, although it was carried on far out in the open sea. Now the fishermen begin more and more to procure small decked vessels of 5 or 6 lasts; because nearly every year several of the open boats disappeared.

The boats go in the afternoon to sea, and cast their nets in sets of 40, each of 20—30 fathoms broad and 80—120 meshes deep, with a width of mesh of 38—40 millimetres These nets which are made of very fine hemp, flax or cotton yarn, are kept, by means of cork floats on the upper edge, and small stones at a distance of a fathom from each other in the lower edge, upright in the water. With this long set of nets, the boat drifts about during the whole night, and returns to shore in the morning.

The take of the several boats is very variable accordingly as they meet greater or smaller shoals of mackerel and as the wind or current may be favorable. If these are too weak, it is impossible for the fisherman to keep the set of nets extanded in one line. On the average, each boat will bring in, if the fish is tolerably collected, about 1000 fish every morning.

This applies to the fishery along the west coast of Norway.

The fishermen who work in the tract from cape Lindesnæs to the Swedish frontier, are obliged to make use of shorter sets, 15—20 nets; because so many sailing and steam vessels go through the waters where they have to pass whole nights.

The catch with stationary nets is in the summer not often productive, bocause the fish easily see the snare in the light nights, and also do not at this season of the year approach the coast in great numbers.

The take is frequently richer with drag-nets or sweep-nets when the mackerel come into the fjords in the autumn; for it occasionally happens that 10—20,000 are taken at one haul.

As the mackerel fishery takes place on a long tract of coast, and as by far the greatest part of the produce is consumed fresh or salted by the inhabitants of the coast themselves; as moreover the number of boats engaged can not be accurately ascertained, it is difficult to form a clear opinion of the total yield. Judging from the increase in the number and extent of the outfits for this fishery which has been observed during the last years, especially on the west coast of Norway, we are disposed to assume that about 2500 boats are engaged in it, and that they bring to land 30—35 millions of fish.

In the year 1862 large shoals of another sort of mackerel (Caranx trachurus) approached the coasts of the provinces of Bergen and Stavanger and gave occasion for a very productive capture; subsequently these fish have not reappeared.

Preparation of and trade in Mackerel.

Twenty years ago there were no foreign markets for mackerel; and the fishermen were thus entirely dependent on the home consumption for the sale of their fish. There were indeed, in some particular years, shipped a few thousand barrels of salted mackerel to France and Holland; but no regular sale to those countries could be calculated on. The fish destined for export were, like those intended for winter consumption in Norway, emptied, slit open and carefully washed, filled with white sea salt and then placed in layers in beech or pine wood barrels with sufficient salt between each layer. The roes were then salted in tight barrels.

But after that in the year 1860 a regular steam communication was established between Norway and Great Britain, English speculators who had noticed the abundance of mackerel in Norwegian waters and the cheap price of this fish, began to purchase large quantities in the fresh state and to export them packed in ice. This new market gave occasion to an immense development of the traffic. In every small port there were erected small ice warehouses which were filled in the winter with ice from the neighboring lakes, and in which afterwards the mackerel were packed in the summer. These warehouses are still built of boards 4 centimetres thick, and contain several rooms for keeping the ice. The rooms have double walls, floors and roofs of boards, the intervals between which of about 30 centimetres are filled with sawdust. The warehouses contain also working rooms in which the ice blocks are broken in pieces and the packing of the fish takes place. The fresh mackerel are thus exported in boxes containing each 120—200 fish packed in layers with small pieces of ice between each layer.

Usually the English speculators or their agents in Norway, as also the Norwegian merchants who export mackerel for their own account, make their arrangements with the fishermen, before the beginning of the fishery in the spring, as to the price of the fish to be delivered. But many fishermen prefer to make their bargain after they have the fish in hand. According to circumstances and to the success of the fishery, either of these modes of sale may be the most advantageous. As average price for the last years we may take 60 cents per score.

In the beginning of the season many quick-sailing English cutters come to the Norwegian coast to fetch the mackerel, some of which is also transported in Norwegian sailing ships, and steam vessels are likewise employed in this traffic.

The roes of the mackerel consumed in Norway, which are collected and salted, go to France, and are, like the cod roe, used for bait in the cod fishery.

A great source of profit for several coast districts of the south of Norway is

The capture of the Lobsters (homarus vulgaris)

as this not only furnishes a valuable and favorite food for the more wealthy inhabitants of the country, but also a product for foreign export to the value of 3—400,000 florins yearly.

The lobsters are found along the whole coast from the Swedish frontier to the Lofoten group; but they are not sought after by the fishermen who live to the north of the Moldefjord. In the winter they keep mostly in the deep waters, and in the spring they approach the coast, and appear to prefer the stony bottom overgrown with brown sea weed (algæ).

The lobsters are taken by means of barrel-shaped baskets of sticks or plait-work, at one end of which the opening is large enough for the lobsters to enter easily, but so arranged that it is impossible for them to get out again. In these baskets, herrings or other fish are placed as bait, so that the lobsters easily discover them. The baskets are sunk to the bottom by means of stones, at a depth of 3—4 fathoms, after being attached to lines the ends of which are retained on the surface by means of floats of wood serving to mark the position of the baskets and to draw them up. The baskets are taken up every morning and evening.

As soon as the baskets are emptied, the claws of the lobsters are bound together with string furnished by the purchaser, in order that the animals may not attack and injure each other; they are then put into a box with holes, which is left in the water awaiting the arrival of the buyer.

Each boat usually carries about thirty baskets. One lobster in a basket is considered to be a satisfactory result, but sometimes two or three are found. In all there are at least 3 millions of lobsters taken yearly. From the 15 July to the 30 September the capture of lobsters is forbidden.

The trade in lobsters is chiefly in the hands of English firms who have their agents along the coast. These agents receive the lobsters from the fishermen, and store them in wells or reservoirs in the sea until the seam or sailing vessels arrive to convey them to destination. They mostly make arangements with the fishermen, before the season, to take a fixed price for every lobster delivered.

Formerly the usualy price was 4 to 6 cents each; in the later years it has been 8 cents. The fixed price applies only to lobsters which have a length of at least 21 centimetres and which have not lost either of the two claws. The smaller ones, and those which have lost a claw, are taken at half the agreed price.

Most of the lobsters are exported alive, in vessels in the hold of which the sea water runs in and out through holes; but in several towns they are also preserved.

On the coasts which are visited by the lobsters, large numbers of sea crabs (Cancer pagurus) are usually found with them; and the crabs are caught in the same manner for the consumption of the country. These crabs are extremely greedy, and on this account there are sometimes found 20—30 of them in a basket. But they are of little value, and they are sold on the fish markets at Bergen and Stavanger for ½—1 cent each.

To this class belong also the prawns (Palemon squilla) which are found in great numbers in southern Norway, and are partly used for bait, partly eaten by the more wealthy inhabitants of the towns.

Oysters

are found in Norway almost everywhere, from the mouth of the Christiania fjord to the mouths of the Namsen fjord; but the banks do not yield any abundant supply and scarcely a sufficient quantity for the inland consumption, which moreover has considerably increased in the last years. Several banks which were formerly very productive, yield now scarcely any product; and on the whole, the quantity collected appears decreasing, on which account the owners of the banks have during the last years paid a little more attention to them than formerly. Artificial production of oysters is tried experimentally, and good future results are hoped for.

In the summer, oysters are not much eaten; and for this reason the capture of them is almost entirely suspended during the summer. Oysters are taken with dredging nets, which are attached to cords and drawn by boats or fixed to poles.

The «blue beard» (Mytilus edulis, Linn.) is found in great abundance almost along the whole coast-tract of Norway. It is however seldom eaten, but is chiefly used as bait in the cod-fishery.

There is perhaps no single river of any importance on the long coast from the Swedish to the Russian frontier where the is not carried on. Also in the sea among the skerries, along the coast and in the fjords these finer fish are everywhere found, even if not in large numbers.

Unfortunately trout and salmon were for a long time pursued with the greatest recklessness, and especially the very young fish were taken; the mouths of the rivers were sometimes so barred with nets that it was impossible for the fish to run up the rivers to spawn.

Fearing a considerable diminution of the yield, nay even the extermination of the Salmonidæ in the northern waters caused by such unreasonable capture, the legislature came forward with protective laws. Thus the salmon and the salmon trout (Salmo trutta) may not be taken from the middle of September to the middle of February, neither in the rivers nor in the estuaries nor in the sea; the use of set-lines is forbidden; the fjords and mouths of rivers must not be so obstructed with nets that the fish cannot pass. In several fjords cruives may only remain out three days in the week; the minimum of the size of the meshes of nets is fixed at 6 centimetres between the knots, and finally every fish that does not measure 8 inches in length, must, when taken, immediately be returned to the water. The government has also made great sacrifices in order to promote the artificial propagation of fish, and such efforts have so far been crowned with good success. Especially, several rivers, in which trout and salmon were not formerly found, have been stocked with these fish: and this has been also the case on a much larger scale in the numerous lakes, in which hundreds of thousands of young fry not only of the species Salmo fario and Salmo alpinus have been placed, but also of salmon and salmon-trout fry, which everywhere appear to thrive well. Moreover in many waterfalls of the rivers, ladders have been arranged to facilitate the ascent of the fish. Therefore the well-founded hope is entertained that there will soon be a great abundance of Salmonidæ on the Norwegian coast as well as in the rivers and lakes. The salmon and sea trout rise in the spring from the deeps outside the coast, which they inhabit during the winter, in order to run up the rivers and spawn in the fresh water, as soon as the ice has disappeared from the rivers and from the lakes which are connected with the sea. Towards autumn the salmon return to the sea. At this time the fish is lean and of little value; but a residence of a few months in the open sea is sufficient to restore its condition and to make it the finest and most valuable of all fishes.

In the fjords, the implements used for the capture of the salmon consist partly of ordinary nets, which are set out like cod-nets, partly of drag nets, and partly of large cruives floating on the surface and fastened either to poles or to the shore.

In the rivers the same implements are used; but a great number of fish are also taken with the hook, partly by professional fishermen, partly by sportsmen, especially Englishmen who rent the right of fishing in many rivers from the proprietors of the shores.

In brooks and waterfalls, the salmon are often taken in boxes or baskets, when the fish make false leaps and fall down again.

A favorite medthod of capture in some waters is the capture with torches. The fisherman is armed with a torch in one hand, and a spear in the other, and strikes the fish while they remain immovable, attracted and dazzled by the light.

The greater part of the salmon and sea-trout caught, is consumed in Norway fresh or salted; only a small quantity is exported, fresh in ice, smoked or hermetically preserved.

We may estimate however that with the high prices of the last years, often 50 cents per Kilo of fresh fish, the export value will reach one miilion of dollars.

Also the rent which the foreign sportsmen pay for the right of fishing to the owners of the river shores, amounts in several districts to rather considerable sums.

Besides the coast fishery previously noticed, the Norwegians carry on several sorts of fisheries in the open sea, which are of great importance in the economy of their country.

Among these the

Seal fishery

occupies the first place.

This capture takes place on the island of Jan Mayn and in the arctic sea, by means of about twenty steam- and sailing vessels from abont 120 to 200 lasts, which mostly belong to Tønsberg.

The sealing vessels are all furnished with a double skin of thick planks, and their stems are armed with strong iron plates to protect them from the ice and to enable them to break through it. Their crews consist of 40—50 men. Each ship is furnished with 8 or 9 boats, in which the hunters pursue the seals partly with guns and partly with clubs, and in which the animals killed are brought on board the ship.

Here the seals are flayed; and the blubber is stored in large casks or iron tanks, to be boiled when brought home.

The gross produce of the Norwegian seal-fishery amounts yearly to about Doll. 500,000, of which the crews, each man according to his rank, receive a fixed part, besides their food, as remuneration for their labor.

The seal fishery is extremely dangerous and, under unfavorable circumstances, frequently precarious; but nevertheless it is a very favorite occupation of seafaring men, as their courage and endurance are, on the other hand, often richly rewarded.

Unfortunately it seems that in consequence of the continually increasing outfits for this capture in the northern countries, the apprehension is entertained that the seals will be exterminated; and the European nations interested in the fishery have entered into an arrangement for the protection of the animals.

For the inhabitants of Finmark, the capture of

The Scymnus (squalus borealis)

is a fishery of great importance. This shark is found in great abundance along the coast of western Norway, but especially on the banks in the icy ocean.

These banks lie at a distance of 15 to 20 miles from the shore, and at a depth of from 250 to 300 fathoms. It is therefore necessary to employ decked vessels; but the size seldom exceeds 15 lasts, with a crew of 5—6 men.

The usual implement of capture is a line of about 1 centimetre in diameter, which is rapidly sunk by a lead weighing 3—4 kilogrammes. The snood is a tinned iron chain about three fathoms long; as the sharp teeth of the animal would spoil the hempen line, if they came in contact with it. The hooks are of strong iron or steel, nearly a centimetre in diameter. As soon as the vessels arrive at the banks, the anchor is cast and the lines are thrown out with a perforated box containing putrid, strong-smelling seal-blubber attached two fathoms above the hook. This bait flows out through the holes, and the smell carried by the current does not fail to attract the fish, which generally swallows the hook baited with seal-blubber. The fisherman holds the line in his hand as in cod-fishing. If he perceives that the shark has taken the hook, he makes a powerful movement with his hand in order to force the hook into the flesh. As soon as the shark feels that he is caught, he rolls himself up in the snood; and the fisherman hauls the line up with all his might, sometimes having recourse to a small windlass, which all these vessels have on board. When the fish appears on the surface, it is killed and held with large hooks; the stomach is opened, the liver taken out, after that the swimming bladder is filled with air through a blow-pipe to prevent the body from sinking. The body is then fastened to the after part of the ship. Sometimes other sharks follow the captured one to the surface, and these are attacked with large hooks and held until their liver can be taken out. When the vessels quit a bank, it is usual to attach a buoy to each body to keep it on the surface; otherwise it would be eaten by the living sharks; and their voracity would thus be so far abated that they would disregard the bait on the hook.

The produce of this fishery is not only dependent on the wind and weather, which in the arctic waters are very changeable and boisterous, but also on casually meeting with numerous flocks of these animals and on their size. There are some whose liver weighs only 12-15 Kilos, while in others it may weigh 100 or even 200 Kilos.

They are now beginning to try to bring the carcases of the squalus to land, and to make manure of them. But the scymnus is found not only on the banks in the open sea; sometimes in the autumn and in the winter, these sharks visit the fjords and the coasts of Finmark, and they are pursued as well with hand-lines as with set-lines. The latter have usually about 30 hooks fixed 6-7 fathoms from each other and kept above the bottom by glass floats.

The yearly produce of the scymnus fishery may be estimated at about 8—10000 barrels of liver, in value about Doll. 50000.

When dissolved by steam the liver yields a fine burning oil, which is often used in the towns instead of rape-oil. The undissolved parts of the liver are boiled into brown tanner's oil.

Other species of squalus, such as S. spinax and S. acantheus have their abode on the banks outside of the southern coasts of the country; but they are seldom pursued.

The Selache maxima, which in the beginning of this century were taken in considerable numbers in the neighborhood of Bergen, seem for the present to have disappeared from the Norwegian waters.

On the other hand,

the capture of Delphinapterus leucas

of Walruses, Polar-bear and Seals, as also Reindeer-hunting and collection of Eider-down on the island of Spitsbergen, afforded until in the last few years, a productive field for the labor of the bold Norwegian seamen.

During many years small vessels of 40—60 tons were fitted out by the merchants of the towns of Finmark every summer for Spitsbergen. The crew, consisting of 7—8 men, hunted in the waters along the coast and on the ice. They hunted the porpoises and walruses with lances and harpoons; the polar-bears and seals with rifles and lances. On the land, the hardy Norsemen pursued the wild reindeer and robbed the nest of the eider-duck of its soft, costly down. Most of the vessels returned in the autumn with a satisfactory booty. But several also were shattered in the ice, and lost their crews by hunger and cold. Sometimes a few of them succeeded in reaching the main land of Spitsbergen, where they either passed the winter in great misery or (most frequently) died. Nevertheless there is no want of seamen and hunters to run the risk again; for their gain amounts sometimes to Doll. 50—80, which is very tempting for 6—8 weeks' work.

In the years 1860—70, vessels from the southern provinces, and among them several steam-vessels, had joined those of Finmark; and the new comers captured the porpoises in a more rational manner. When the animals moved along the coast of Spitsbergen in shoals, these fishermen fastened one end of their large net made of strong cords and about 900 fathoms long by 10 deep (diminishing at the sides to 4 fathoms) and dragged the other end by means of boats or the steam vessels outside of the shoal of porpoises to the shore; so that the whole net formed a semi-circle and the animals were enclosed. Then the porpoises were dragged ashore, by means of smaller drag-nets thrown out within the large net, and killed with lances. Usually 20—30, sometimes even as many as 60 could be thus enclosed at once. As soon as they were taken on shore, they were flayed; the livers were taken out and put in tubs in order to be dissolved or boiled on the return home; and the skin was salted. The average value of a porpoise may be estimated at Doll. 40. Usually the livers and the skins are sold in Hammerfest or Tromsø, and there prepared for exportation.

It seems however that the destruction of the white-fish has been greater than its reproduction; at least the produce of the capture in the last decennium has been so little, that most of the vessels not belonging to Finmark have given it up. But the Spitsbergen ventures are still continued by outfits from the most northern towns of the land, and especially from Hammerfest.

Freshwater fisheries.

As is well known, there are in the interior of Norway even in the mountains an immense number of larger and smaller lakes. Many of them contain various species of fish, but most of them are uninhabited. Whether it is that they have always been so or that they have been fished out by reckless capture, one thing is certain, namely that many of these lakes could support a great quantity of fish; and as observed under the head of salmon fishery, a commencement has been made with this view, by stocking them with the fry of the Salmo fario and Salmo alpinus. Even the salmon appears to thrive in the lakes, although its flesh loses somewhat of the red color. Whether it will develop itself as well as the Salmo alpinus in the rivers connected with the sea, experience will teach us.

Besides the Salmonidæ, we find in the lakes the Pike (Esox lucius), the Coregonus lavaretus, the Coregonus albula, the Perca fluviatilis, the Cyprinus carassius, the Bream (Abramis brama) and the Lota vulgaris, which are all taken by the inhabitants of the shores as well with nets as with set-lines and hand-lines, nay even with cruives, and furnish a valuable contribution to the support of the population. We estimate the value of the produce of the fresh water fisheries at fully Doll. 500,000 yearly.

Synopsis of the produce of the Norwegian fisheries.

The annexed statistical tables give an exact synopsis of the export of the principal fish-products in the years 1868—1874 which we may resume as follows:

1,000,000	barrels herrings à Doll. 3.50	3,500,000
30,000,000	kilos rock-fish à Doll. 8 per 100 kilos	2,400,000
15,000,000	— stock-fish à Doll. 7 - » »	1,050,000
60,000	barrels salt fish à Doll. 4	240,000
100,000	— oil and blubber à Doll. 14	1,400,000
35,000	— fish roe à Doll. 10	350,000
1,000,000	lobsters à Doll. 8 Ct.	80,000
Fresh and preserved fish		280,000
2,000,000	kilos fish guano	50,000
		9,350,000
Add the value of the fish and fish products consumed in the country		3,000,000
so that the total value of the produce of the fisheries may be estimated at		12,350,000

truly a magnificent sum for a country the population of which does not exceed 1,800,000 souls.

The fishery along the coast is free for every Norwegian, and he may if he pleases, excepting in the fence time and in the cases excepted by the law, fish without subjecting his industry to any direct taxation. Only when he uses sweep-nets or drag-nets he is bound to pay dues to the proprietor of the coast on which the nets are drawn to land, which dues vary from 3 to 6 per cent of the yield.

There are also levied on the products exported a small export-duty and some trifling dues, which serve to defray the expenses of establishing new harbors in the fishing districts, and for the maintenance of hospitals and medical men during the great fisheries.

The import of foreign fish is entirely free; but there is an import-duty on salt of about 15 cents per barrel of 140 litres. In the lakes and rivers the right of fishing belongs to the proprietors of the shores.

Foreigners are only allowed to fish one mile outside of the exterior skerries.

STATISTICAL REPORTS.

NORWAY'S EXPORT OF THE PRINCIPAL FISH-PRODUCTS IN 1873.

Towns whence the export has taken place.	Fishguano.	Fresh fish.	Stock-fish.	Rock-fish.	Fish salted in casks or loose in ship's hold.	Large Herrings.	Summer-Herrings.	Other Herrings and Sprats.	Lobsters.	Roe.	Oil.
	Centners.	Centners.	Centners.	Centners.	Barrels.	Barrels.	Barrels.	Barrels.	Number.	Barrels.	Barrels.
Vadsø	11,090		30,342		6,774						7,246
Vardø			21,997		35,247		267				3,934
Hammerfest			56.899	98	16,396	1,497	283				14,918
Tromsø	294		49,768		3,938	10,937	4,569				8,260
Trondhjem	1,119	495	16,132	6,821	76	21,598	40,502				2,557
Christiansund	3,832		6,005	302,215		14,629	49,392	651	100	6,093	6,389
Molde	1,312			2,160		235	4,304	3		560	52
Aalesund	2,596		404	130,405	6,204	9,125	13,184	1,034	10,020	6,812	2,430
Bergen	2,600	801	177,003	111,484	118	159,586	183,984	40,692	95,487	30,942	54,427
Hougesund		3,349	772			17,171	17,280	7,744	36,654		
Skudesnæshavn		113			400	1,557	7,071	1,433	52,825		1
Stavanger	2,000	292	221	192	1,275	11,991	35,537	42,648	107,219		230
Egersund		5,666	77			1,331	789	205	93,744		
Flekkefjord		3,180						301			
Farsund		21,765	485			100		15	140,181	870	
Mandal		94	48				80	508	44,400	1	2
Christiansand	2,834	28,829	720	6,032	44	40	2,258	366	199,323		1,410
Other towns [1]	11,230	6,431	7,085	73	17	[2]43,996	12,647	7,809	[3]139,991		3,252
Total	38,907	71,015	367,958	559,480	70,489	293,793	372,147	103,409	919,994	45,278	101,508

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[1] Bodø.

[2] of which from Bodø 4,039 Brls.
and from Christiania 39,175 —

[3] of which from Florø 33,400
« « « Arendal 16,790
« « « Østerrisør 28,241
« « « Kragerø 30,000
« « « Laurvig 29,510

THE ABOVE FISH-PRODUCTS WERE SENT TO THE FOLLOWING COUNTRIES AND PLACES.

Countries.	Fish-guano.	Fresh fish.	Stock-fish.	Rock-fish.	Fish salted in casks or loose in ship's hold.	Large Herrings.	Summer Herrings.	Other Herrings and Sprats.	Lobsters.	Roe.	Oil.
	Centners.	Centners.	Centners.	Centners.	Barrels.	Barrels.	Barrels.	Barrels.	Number.	Barrels.	Barrels.
Sweden		8	70,879	193	183	188,460	28,617	17,891	1,800		466
Denmark	8,350	80	4,825	108	1	3,800	45,361	1,328	29,770		1,739
Russia and Finland .			25,447	52	57,277	59,965	33,387	45,612			811
German Baltic ports	804		1,891	184	88	25,747	208,807	25,997			8,720
Hamburg & Altona .	29,753	542	4,760	26,170	92	3,467	46,463	2,486	121,457	1	42,863
Bremen and other North Sea ports .			127			10	10				4,888
Holland		10	69,501	1,039	1	7,535	2,128	963	6,130		33,091
Belgium		4	21,973	72		116		15	205,656		1,953
Great Britain		70,320	3,770	16,198	12,845	4,672	2,765	3,846	554,831	157	6,681
France		51	3,345	158	2	21	4,453	5,271	300	43,953	1,928
Spain			3,788	422,234						1,173	269
Portugal				27,117							
Austria and Italy . .			151,228	907							1,552
North America . . .			238	2			156				147
Cuba			521	54,190							
South America . . .			513	10,856							
Other Countries . . .			5,152								
Total	38,907	71,015	367,958	559,480	70,489	293,793	372,147	103,409	919,944	45,278	105,108

NORWAY'S EXPORT OF THE PRINCIPAL FISH-PRODUCTS IN 1874.

Towns whence the export has taken place.	Fish guano.	Fresh fish.	Stock-fish.	Rock-fish.	Fish salted in casks or loose in ship's hold.	Large Herrings.	Summer Herrings.	Other Herrings and Spratts.	Lobsters.	Roe.	Oil.
	Centners.	Centners.	Centners.	Centners.	Barrels.	Barrels.	Barrels.	Barrels.	Number.	Barrels.	Barrels.
Vadsø	24,675		28,642		16,114	198	240	575			8,477
Vardø			40,904		32,658		393				7,240
Hammerfest			69,660		16,590		1,297				13,812
Tromsø			55,578		3,180	24,861	7,063				6,128
Trondhjem	3,156		16,790		30	22,384	70,298				1,928
Christiansund	8,286		4,271	350,260	1	15,979	54,322			4,464	5,298
Molde	2,660			6,832			7,123	203			46
Aalesund	4,396		483	122,439	579	11,402	41,757	2,379		6,608	3,561
Bergen	12	663	162,075	118,934	31	175,959	263,983	6,229	48,250	20,239	51,472
Hougesund		56	81		39	28,343	28,911	1,569	34,850		
Skudesnæshavn					2	1,135	8,807	66	50,150		2
Stavanger		524	202	529	91	17,967	49,430	24,456	93,183	40	134
Egersund		5,932		272	2	389	1,083	576	46,881		
Flekkefjord		2,213			4				7,996		
Farsund		17,684	259			30			125,651	1,040	
Mandal		112						411			
Christiansand	300	15,778	307	4	26	42	685	43	175,414		490
Other towns [1]	[1] 11,043	7,874	6,206	306	77	[2] 47,849	10,426	8,460	[3] 166,699		4,776
Total	54,528	50,836	385,458	599,576	69,424	346,538	545,818	44,967	749,074	32,391	103,364

[1] Bodø.

[2] of which from Bodø 11,590 Brls.
and from Christiania 36,245 —

[3] of which from Lillesand 29,903
« « « Arendal 26,083
« « « Østerrisør 23,763
« « « Laurvik 37,817

THE ABOVE FISH-PRODUCTS WERE SENT TO THE FOLLOWING COUNTRIES AND PLACES.

Countries.	Fish-guano. Centners.	Fresh fish. Centners.	Stock-fish. Centners.	Rock-fish. Centners.	Fish salted in casks or loose in ship's hold. Barrels.	Large Herrings. Barrels.	Summer Herrings. Barrels.	Other Herrings and spratts Barrels.	Labsters. Number.	Roe. Barrels.	Oil. Barrels.
Sweden	13	13	64,363	378	157	200,554	53,114	10,979	14,400		725
Denmark	4,667	27	9,123	422	18	8,198	93,501	3,160	40,161		1,699
Russia and Finland			30,500		68,535	102,470	48,020	18,238			950
German Baltic ports	2,050		2,644	33	10	23,889	295,633	8,906			11,538
Hamburg & Altona	47,476	224	4,110	25,523	7	6,257	52,454	3,499	128,799		44,614
Bremen and other											1,155
North Sea ports						200	109				30,930
Holland	2		56,991	234	13	2,890	530	185		130	2,117
Belgium			19,161	203	28	91			206,112		6,103
Great Britain	320	50,572	4,113	21,314	641	1,989	2,447		359,602	574	1,863
France				1,170	15					31,166	375
Spain			16,660	463,693						521	
Portugal				16,056							1,210
Austria and Italy			176,780	720							85
North America			169				10				
Cuba			799	63,908							
South America			45	5,922							
Other Countries											
Total	54,528	50,836	385,458	599,576	69,424	346,538	545,818	44,967	749,074	32,391	103,364

NORWAY'S EXPORT OF THE PRINCIPAL FISH-PRODUCTS IN 1875.

Towns whence the export has taken place.	Fish-guano.	Fresh fish.	Stock-fish.	Rock-fish.	Fish salted in casks or loose in ship's hold.	Large Herrings.	Summer Herrings.	Other Herrings and Sprats.	Lobsters.	Roe.	Oil.
	Centners.	Centners.	Centners.	Centners.	Barrels.	Barrels.	Barrels.	Barrels.	Number.	Barrels.	Barrels.
Vadsø	11,604		29,368	1	14,729						7,428
Vardø	2,000		35,055		33,636	134		20			6,869
Hammerfest			59,395	118	17,867	968	197	1			10,155
Tromsø	412		54,621	3,682	5,281	16,062	1,603				8,775
Trondhjem	821	1,738	12,147		7	12,722	58,138				2,435
Christiansund	16,942		6,189	410,748	3,301	11,333	76,620			5,998	5,113
Molde	1,920	54		8,822			8,176			652	158
Aalesund	7,088	1,095	581	162,345	6,888	9,069	29,165	872		8,425	3,628
Bergen	4,004	1,133	209,447	150,344	5	147,823	269,724	1,933	69,722	33,001	64,733
Hougesund		2,811	7	7		26,513	50,005	4,033	44,581		
Skudesnæshavn		153		22	2	6,706	10,107	481	66,417		
Stavanger		407	85	12		21,086	57,896	11,443	122,631		137
Egersund		4,227	288			50	918	1,653	49,023		2
Flekkefjord		1,381					19	57	384		
Farsund		14,141		1					71,138	797	
Mandal		317							74,671		
Christiansand	4,000	14,277	539	68	10		215	7	201,214		741
Other towns	[1]27,180	3,039	9,597		8	[2]25,120	29,018	4,789	[3]180,849		3,241
Total	75,971	44,773	417,319	736,536	81,734	277,586	591,801	25,289	880,630	49,073	113,415

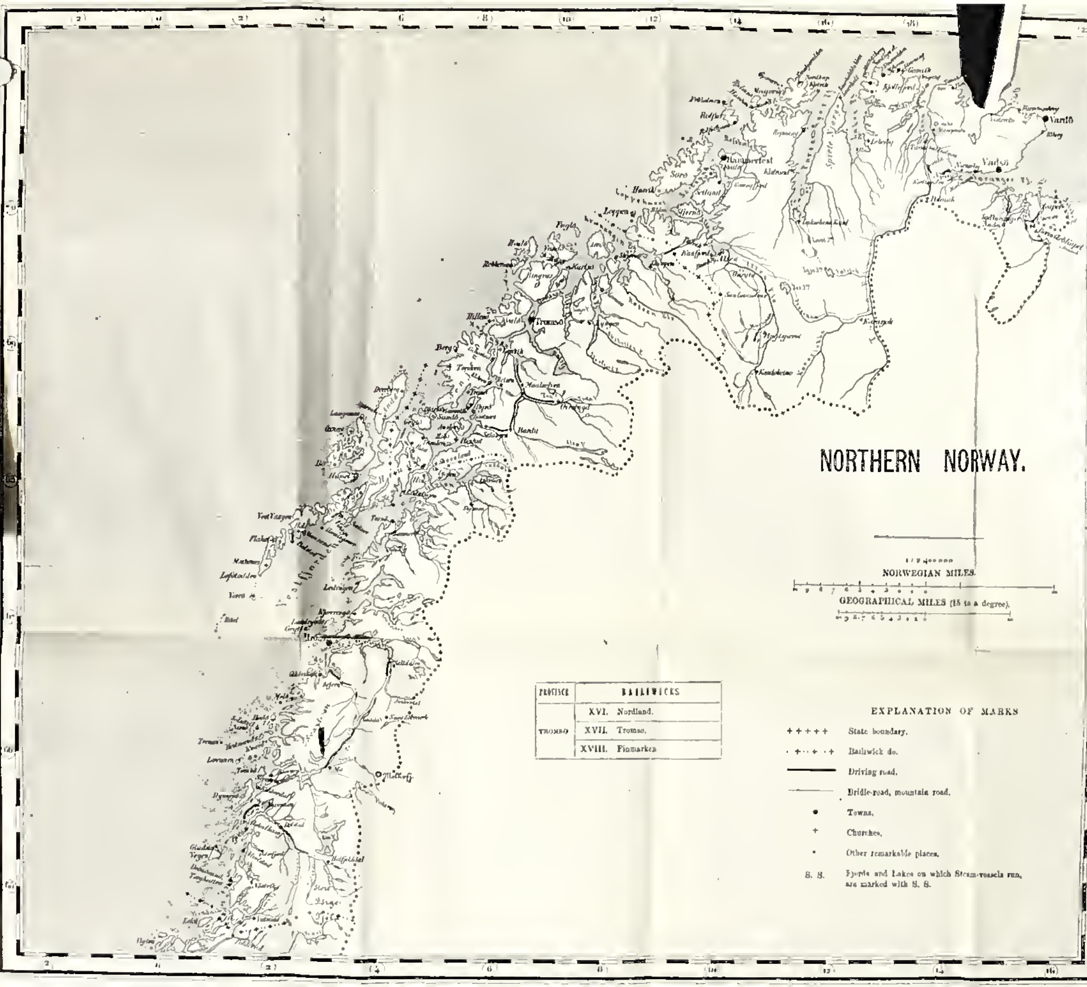
[1] of which from Bodø 25,608 Ctrs.

[2] of which from Bodø 4,142 Brls. and from Christiania 20,951 —

[3] of which from Florø 39.500
« « « Lillesand 34.870
« « « Østerrisør 53.500
« « « Laurvik 44,538

THE ABOVE FISH-PRODUCTS WERE SENT TO THE FOLLOWING COUNTRIES AND PLACES.

Countries.	Fish-guano. Centners.	Fresh fish. Centners.	Stock-fish. Centners.	Rock-fish. Centners.	Fish salted in casks or loose in ship's hold. Barrels.	Large Herrings. Barrels.	Summer Herrings. Barrels.	Other Herrings and Sprats. Barrels.	Lobsters. Number.	Roe. Barrels.	Oil. Barrels.
Sweden	796		70,579	23	6	137,130	118,098	7,839	3,366		560
Denmark	5,876	368	7,520	591	1	5,483	88,830	1,942	48,912		592
Russia and Finland.			38,874		66,576	116,828	69,043	6,927			1,722
German Baltic ports	412	40	1,397	97	3	17,289	259,756	2,703	134,928		12,533
Hamburg & Altona.	64,247	539	6,973	36,199	3	742	45,261	3,079	6,000		38,762
Bremen and other North Sea ports . .				37			460				2,454
Holland	2		61,451	691	1	89	1,300	132		10	36,120
Belgium			24,423	131		15	80		151,006		2,075
Great Britain	4,638	43,822	5,185	40,458	15,134	10	7,609	2,667	536,418	1,024	15,101
France			3,254	4,370			1,233			43,351	2,227
Spain				515,920	4					4,688	234
Portugal			9,129	55,296	1						
Austria and Italy . .			187,449	19,797							1,014
North America . . .			479	7			119				20
Cuba			543	43,392							
South America . . .			63	19,527			12				
Other Countries . . .		4									1
Total	75,971	44,773	417,319	736,536	81,734	277,586	591,801	25,289	880,630	49,073	113,415



PROVINCE	BAILIWICKS
TROMSO	XVI. Nordland.
	XVII. Tromso.
	XVIII. Finmarken

EXPLANATION OF MARKS

+ + + + +	State boundary.
· + · · + · +	Bailiwick do.
━━━	Driving road.
───	Bridle-road, mountain road.
●	Towns.
+	Churches.
▪	Other remarkable places.
S. S.	Fjords and Lakes on which Steam-vessels run, are marked with S. S.